Zouch. Elem. Ju: C. } C. L.
Tholosanus. de Ju: C.

Synesius Epist.

Spigelius fol. } Med.
Fernelius — }

Plut. Mor.
Gyraldus Syntag. Deor.
Gruter. Fax Art.
Schol. in Theoc. cu Heins. et Casaub.

Plato.
Plotin. Em:

Bib. interlin.
Septuag.
Jun. et Trem. in Bib.
Calvin. Inst.

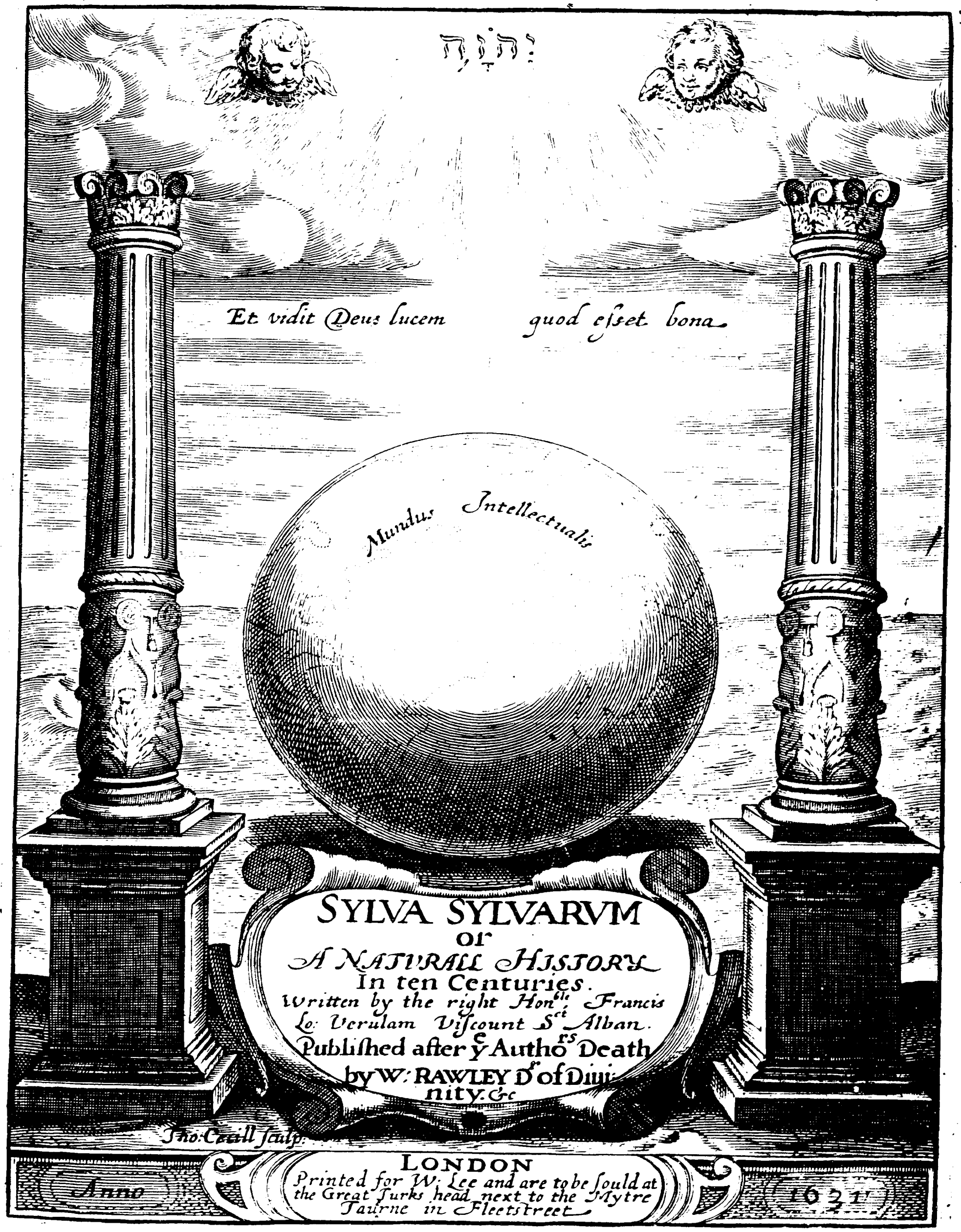
Thucyd. cu schol.
Herodot.
Plut. L.
Liv.
Tacit.

Scalig. De Emend. Temp.

Euclid.
Hues de gl.
Gr: Geog.
Ortel.
Mercat: Atl.

Macrob.


MONITI MELIORA
The right Hon^ble Francis Lo: Verulam, Viscount S^t Alban. mortuus 9° Aprilis, Anno Dni. 1626. Annoq; Aetat. 66.


יְהֹוָה
Et vidit Deus lucem quod esset bona
Mundus Intellectualis
SYLVA SYLVARUM
or
A NATURALL HISTORY
In ten Centuries.
Written by the right Hon^ble Francis Lo: Verulam Viscount S^t Alban.
Published after y^e Autho^rs Death
by W: RAWLEY D^r of Diuinity. &c
Tho: Cecill sculp:
Anno
LONDON
Printed for W: Lee and are to be sould at the Great Turks head next to the Mytre Taurne in Fleetstreet
1631

SYLVA SYLVARVM:

OR,

A Naturall Hiſtorie.

IN TEN *CENTVRIES.*

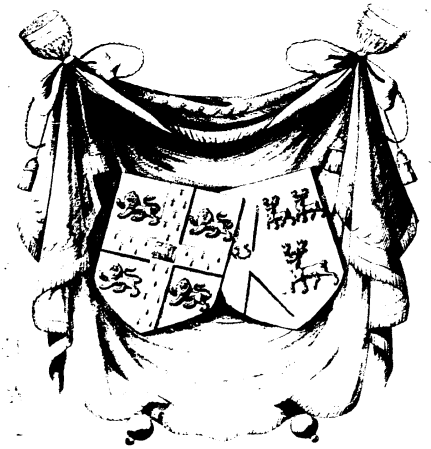
WRITTEN BY THE RIGHT
Honourable FRANCIS LO. *Verulam*
Viſcount St. ALBAN.

Publiſhed after the Authors death,
By WILLIAM RAWLEY *Doctor in Divinitie, one of his Majeſties Chaplaines.*

Hereunto is now added an Alphabeticall Table of the principall things contained in the whole Worke.

LONDON,
Printed by *John Haviland* for *William Lee*,
and are to be ſold by *John Williams*. 1635.

Finding that the third Edition of this Work was published in the year 1631 and the fifth Edition appeared in 1639. I conclude that this which was printed between those, is the third Edition, of the Edition -



Academiæ Cantabrigiensis
Liber.

TO THE MOST HIGH AND MIGHTY PRINCE CHARLES,

BY THE GRACE OF GOD, King of *Great Britaine*, *France*, and *Ireland* Defender of the Faith, &c.

May it please your most Excellent Majestie,

THE whole Body of the *Naturall Historie*, either designed or written, by the late *Lord Viscount S. Alban*, was dedicated to your *Maiestie*, in his Booke *De Ventis*, about foure yeeres past, when your *Maiestie* was *Prince*: So as there needed no new Dedication of this *Worke*, but only, in all humblenesse, to let your *Majestie* know, it is yours. It is true, if that *Lord* had lived, your *Maiestie*, ere long, had beene invoked, to the Protection of another *Historie*;

Historie; whereof, not *Natures Kingdome*, as in this, but those of your *Maiesties*, (during the Time and *Raigne* of *King Henry* the *Eighth*) had been the Subiect: Which since it died under the Designation meerly, there is nothing left, but your *Maiesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions; who was willing to have parted, for a while, with his Darling *Philosophie*, that he might have attended your Royall Commandement, in that other *Worke*: Thus much I have beene bold, in all lowlinesse, to represent unto your *Maiestie*, as one that was trusted with his *Lordships Writings*, even to the last. And as this *Worke* affecteth the *Stampe* of your *Maiesties Royall Protection*, to make it more currant to the *World*; So under the *Protection* of this *Worke*, I presume in all humblenesse to approach your *Maiesties* presence, And to offer it up into your *Sacred Hands*.

Your MAIESTIES *most Loyall*

and Devoted Subiect,

W. RAVVLEY.

To the Reader.

HAving had the Honour to bee continually with my *Lord*, in compiling of this *Worke*; And to bee employed there in; I have thought it not amisse, (with his Lordships good leave and liking,) for the better satisfaction of those that shall reade it, to make known somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I have heard his Lordship often say; that if he should have served the glory of his owne Name, hee had beene better not to have published this *Naturall Historie*: For it may seeme an Indigested Heap of Particulars; And cannot have that Lustre, which Bookes cast into Methods have: But that hee resolved to preferre the good of Men, and that which might best secure it, before any thing that might have Relation to Himselfe. And hee knew well, that there was no other way open, to unloose Mens mindes, being bound; and (as it were)

Maleficiate, by the Charmes of deceiving Notions, and Theories, and thereby made Impotent for Generation of Workes; But onely no where to depart from the Senſe, and cleare experience; But to keepe cloſe to it, eſpecially in the beginning: Beſides, this *Naturall Hiſtory* was a Debt of his, being Deſigned and ſet downe for a third part of the *Inſtauration*. I have alſo heard his Lordſhip diſcourſe, that Men (no doubt) will think many of the *Experiments* conteined in this Collection, to be Vulgar and Triviall: Meane and Sordid; Curious and Fruitleſſe: And therefore he wiſheth, that they would have perpetually before their Eyes, what is now in doing; And the difference betweene this *Naturall Hiſtory*, and others. For thoſe *Naturall Hiſtories*, which are Extant, being gathered, for Delight and Vſe, are full of pleaſant Deſcriptions & Pictures; and affect and ſeek after Admiration, Rarities, and Secrets. But contrariwiſe, the Scope which his Lordſhip intendeth, is to write ſuch a *Naturall Hiſtory*, as may be Fundamentall to the Erecting and Building of a true *Philoſophy*: For the Illumination of the *Underſtanding*; the Extracting of *Axiomes*; and the producing of many Noble *Workes* & *Effects*. For he hopeth, by this meanes, to acquit himſelfe of that, for which hee taketh *Himſelfe* in a ſort bound;

And

And that is, the Advancement of all Learning and Sciences. For having in this preſent Work Collected the Materials for the Building; And in his *Novum Organum* (of which his Lordſhip is yet to publiſh a Second Part,) ſet down the Inſtruments and Directions for the Worke; Men ſhall now bee wanting to themſelves, if they raiſe not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalf, I have heard his Lo. ſpeake complainingly; That his Lordſhip (who thinketh he deſerveth to be an Architect in this building) ſhould bee forced to bee a Work-man and a Labourer; And to digge the Clay, and burne the Brick; And more than that, (according to the hard Condition of the *Iſraelites* at the latter end) to gather the Straw and Stubble, over all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will be done: Men are ſo ſet to deſpiſe the meanes of their owne good. And as for the *Baſeneſſe* of many of the Experiments; As long as they be Gods Works, they are honorable enough. And for the *Vulgarnes* of them; true *Axiomes* muſt be drawne from plain Experience, and not from doubtful, And his Lordſhips courſe is to make VVonders Plaine, and not Plaine things Wonders; And that Experience likewiſe muſt bee broken and grinded, and not

whole,

whole, or as it groweth. And for *Vse*; his Lordship hath often in his Mouth, the two kindes of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments of Vse*, and *Experiments of Light*: And he reporteth himselfe, whether hee were not a strange Man, that should thinke that Light hath no Vse, because it hath no Matter. Further his Lordship thought good also, to adde unto many of the *Experiments* themselves, some *Glosse* of the *Causes*; that in the succeeding work of *Interpreting Nature*: and *Framing Axiomes*, all things may be in more readinesse. And for the *Causes* herein by Him assigned; his Lordship perswadeth Himselfe, they are farr more certaine, than those that are rendred by Others; Not for any Excellencie of his owne Wit, (as his Lordship is wont to say) but in respect of his continuall Conversation with *Nature*; and *Experience*. Hee did consider likewise, that by this addition of *Causes*, mens mindes (which make so much hast to finde out the *Causes* of things,) would not thinke themselves utterly lost, in a vast wood of *Experience*, but stay upon these *Causes*, (such as they are, a litle, till true *Axioms* may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact *Method*, (though hee that looketh attentively into

into them, shall finde that they have a secret Order) was because he conceived that other men would now think that they could do the like; And so goe on with a further Collection: which if the *Method* had beene Exact, many would have despaired to attaine by Imitation. As for his Lorships love of Order, I can referre any Man to his Lordships Latine Booke, *De Augmentis Scientiarum*; which (if my Judgement bee any thing) is written in the Exactest Order, that know any Writing to bee. I will conclude with an usuall Speech of his Lordships. That this Worke of his *Naturall History*, is the *World*, as GOD made it and not as Men have made it; For that it hath nothing of Imagination.

This Epistle is the same, that should have beene prefixed to this Booke, if his Lordship had lived.

W: Rawley.

A TABLE OF the Experiments.

Century. I.

Of

Century. II.

Century. III.

Of

Century. IV.

Of

Century. V.

Century. VI.

Century.

Century VII.

Century VIII.

Of

Of

Century IX.

Of

Century. X.

Of

FINIS.

NATVRALL HISTORIE.

I. Century.

1

Experiments in *Consort*, touching the Straining and Passing of Bodies one through another: which they Call *Percolation*.

DIGG a *Pit* upon the *Sea shore*, somewhat aboue the High-water Marke, and sinke it as deepe as the Low-Water Marke; And as the *Tide* commeth in, it will fill with *water*, Fresh and Potable. This is commonly practized upon the Coast of *Barbary*, where other fresh *water* is wanting. And CESAR knew this well, when he was besieged in *Alexandria*: For by Digging of *Pits* in the *Sea shore*, hee did frustrate the Laborious Workes of the Enemies, which had turned the *Sea water* upon the Wells of *Alexandria*; And so saved his Army, being then in Desperation. But *Cæsar* mistooke the Cause, For he thought that all *Sea-Sandes* had Naturall Springs of *Fresh water*. But it is plaine, that it is the *Sea-water*, because the Pit filleth according to the Measure of the *Tide*: And the *Sea-water* passing or Strayning through the Sandes, leaueth the Saltnesse.

2

I remember to have Read, that Triall hath beene made of *Salt-water* passed through *Earth*; through Ten Vessells, one within an other, and yet it hath not lost his Saltnesse, as to become potable: But the same Man saith, that (by the Relation of Another,) *Salt water* drained through twenty Vessells, hath become Fresh. This *Experiment* seemeth to crosse that other of *Pits*, made by the *Sea side*; And yet put in part, if it be true, that twenty Repetitions do the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common course of *Experiments*, except they be led by great Iudgement, and some good Light of *Axiomes*. For first, there is no small difference betweene a Passage

Passage of *water* through twenty small Vessells; And through such a distance, as betweene the Low water and High water Marke. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides Earth doth not strane the Water so finely, as Sand doth. But there is a Third Point, that I suspect as much, or more than the other Two; And that is, that in the *Experiment* of *Transmission* of the *Sea-water* into the *Pits*, the *water* riseth; But in the *Experiment* of Transmission of the *water* through the Vessells, it falleth: Now certaine it is, that the Salter Part of *Water*, (once Salted throughout) goeth to the Bottome. And therefore no mervaile, if the Draining of *water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the vera Dashing of the *Water*, that commeth from the Sea, is more proper to strike of the Salt part, than where the *water* slideth of her owne Motion.

3 It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*,) is a good kinde of *Separation*, Not onely of Thicke from Thin, and Grosse from Fine; But of more subtile Natures; And varieth according to the Body through which the *Transmission* is made. As if through a wollen Bagg, the Liquour leaveth the Fatnesse; If through Sand, the Saltnesse, &c. They speake of Severing Wine from Water, passing it throug Ivy wood, or through other the like porous Body; But *Non Constat.*

4 The *Gumms* of *Trees* (which wee see to be commonly shining and cleare) is but a fine Passage or *Straining* of the Iuice of the Tree, through the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent than *Gumms*) are the fine Exudations of *Stone.*

5 *Aristotle* giveth the Cause, vainely, why the *Feathers* of *Birds* are of more lively Colours, then the *Haires* of *Beasts*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire.* He saith, It is, because *Birds* are more in the Beames of the Sunne, then *Beasts*; But that is manifestly untrue; For *Cattle* are more in the Sun than *Birds*, that live commonly in the Woods, or in some Covert. The true Cause is, that the Excrementious Moisture of living Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer and more delicate Strainer, than it doth in *Beastes*: For *Feathers* passe through Quills; And *Haire* through Skin.

6 The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleaving Body is Mixed and Agitated with the *Liquours*, wherby the grosser Part of the *Liquor* sticks to that Cleaving Body; And so the finer Parts are freed from the Grosser. So the *Apothecaries*. clarify their *Sirrupes* by whites of Eggs, beaten with the Iuices which they would clarify; which Whits of Eggs, gather all the Dregs and grosser Parts of the Iuice to them; And after the *Sirrup* being set on the Fire, the whites of Egges themselves harden, and are

are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about; And then passing it through a Wollen Bagge, which they call *Hippocrates Sleeve*, And the Cleaving Nature of the Milke draweth the Powder of the Spices, and Grosser parts of the *Liquour* to it; And in the passage they stick upon the Woollen Bagge.

The *Clarifying* of *water*, is an *Experiment* tending to Health; besides the pleasure of the Eye, when *water* is Crystaline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *water* may straine through them. 7

It may be, *Percolation* doth not onely cause Cleareness and Splendour, but Sweetnesse of Savour; For that also followeth, as well as Clearenes, when the Finer Parts are severed from the Grosser. So it is found, that the Sweates of Men that have much Heat, and exercise much, and have cleane Bodies, and fine Skins, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gumms* have sweet Odours. 8

Experiments in Consort touching *Motion* of *Bodies* upon their *Pressure.*

TAke a *Glasse*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the Glasse, pressing it somewhat hard; And after you have drawne it some few times about, it will make the Water frisk and sprinckle vp, in a fine Dew. This *Instance* doth excellently Demonstrate the Force of *Compression* in a Solid Body. For whensoever a Solid Body (as Wood, Stone, Mettall, &c.) is pressed, ther is an inward Tumult in the parts thereof, seeking to deliver themselves from the Compression; And this is the Cause of all *Violent Motion.* Wherein it is strange in the highest Degree, that this *Motion* hath never been observed, nor inquired; It being of all *Motions*, the most Common, and the Chiefe Roote of all *Mechanicall Operations.* This *Motion* worketh in round at first, by way of Proofe, and Search, which way to deliver it selfe; And then worketh in Progresse, where it findeth the Deliverance easiest. In *Liquors* this *Motion* is visible: For all Liquours strucken make round Circles, and withall Dash; but in *Solids*, (which breake not,) it is so subtile, as it is invisible; But nevertheless bewrayeth it selfe by many effects; as in this *Instance* whereof we speake. For the *Pressure* of the Finger furthered by the wetting (because it sticketh so much the better unto the Lip of the *Glasse*,) after some continuance, putteth all the small Parts of the *Glasse* into worke; that they strike the *water* sharply; from which *Percussion* that Sprinkling commeth. 9

If you strike or pierce a *Solid Body*, that is brittle, as *Glasse*, or *Sugar*, it breaketh not onely, where the immediat force is; but breaketh all about into shivers and fitters; The *Motion*, upon the *Pressure*, searching all wayes; and breaking where it findeth the *Body* weakest. 10

The *Powder* in *Shot*, being Dilated into such a *Flame*, as endureth not *compression*; Moveth likewise in round, (The *Flame* being in the Natur of a *liquid Body*:) Sometimes recoyling; Sometimes breaking the *Piece*; 11

But

But generally discharging the *Bullet*, becaus̃e there it findeth easiest Deliverance.

12 This *Motion* upon *Pressure*, and the Reciprocall thereof, which is *Motion* upon *Tensure*; we vse to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Dimension, delivereth and restoreth it selfe to the Naturall: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Cloathe* tentured spring backe. These two *Motions* (of which there be infinite Instances,) we shall handle in due place.

13 This *Motion* upon *Pressure* is excellently also demonstrated in *Sounds*. As when one Chimeth upon a *Bell*, it soundeth; But as soon as he layeth his hand upon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginall String*, as soone as the Quill of the Iack falleth upon it, stoppeth. For these *Sounds* are produced, by the subtile Percussion of the Minute parts, of the *Bell*, or *String*, upon the Aire; All one, as the *Water* is caused to leape by the subtile Percussion of the Minute parts of the *Glasse*, upon the Water, whereof we spake a little before in the 9th. *Experiment*. For you must not take it to be, the locall *Shaking* of the *Bell*, or *String*, that doth it. As well shall fully declare, when we come hereafter to handle *Sounds*.

Experiments in *Consort*, touching *Separations of Bodies by weight*.

14 TAke a *Glasse* with a *Belly* and a long *Nebb*; fill the *Belly* (in part) with *Water*: Take also another *Glasse*, whereinto put *Claret Wine* and *Water* mingled, Reverse the first *Glasse*, with the *Belly* upwards Stopping the *Nebb* with your fingar; Then dipp the Mouth of it within the Second *Glasse*, and remove your Finger: Continue it in that posture for a time; And it will unmingle the *Wine* from the *Water*: The *Wine* ascending and setling in the topp of the upper *Glasse*; And the *Water* descending and setling in the bottome of the lower *Glasse*. The passage is apparent to the Eye; For you shall see the *Wine*, as it were, in a small veine, rising through the *Water*. For handsomnesse sake (because the Working requireth some small time) it were good you hang the upper *Glasse* upon a Naile. But as soone as there is gathered so much pure and unmixed *Water* in the Bottome of the Lower *Glasse*, as that the Mouth of the upper *Glasse* dippeth into it, the *Motion* ceaseth.

15 Let the Vpper *Glasse* be *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Upper *Glasse* be *Water* pure, the Lower *Water* coloured; or contrariwise; there followeth no *Motion* at all. But it hath beene tried, that though the Mixture of *VVine* and *VVater*, in the Lower *Glasse*, be three parts *VVater*, and but one *VVine*; yet it doth not dead the *Motion*. This *Separation* of *VVater* and *VVine* appeareth to be made by *VVeight*: for it must be of *Bodies* of unequall *VVeight* or ells it worketh not; And the Heavier *Body* must ever be in the upper *Glasse* But then note withall, that the *VVater* being made pensile, and ther being a great *VVeight* of *VVater* in the *Belly* of the *Glasse*, sustained by

by a small Pillar of *Water* in the Neck of the *Glasse*; It is that, which setteth the *Motion* on worke: For *Water* and *Wine* in one *Glasse*, with long standing, will hardly sever.

This *Experiment* would be Extended from Mixtures of severall *Liquors*, to *Simple Bodies*, which Consist of severall Similare Parts: Try it therefore with *Broyne* or *Salt water*, and *Fresh water*: Placing the *Salt water* (which is the heavier) in the upper *Glasse*; And see whether the *Fresh* will come above. Try it also with *Water thick Sugred*, and *Pure water*; and see whether the *water* which commeth above, will loose his Sweetnesse: For which purpose it were good there were a little Cock made in the Belly of the upper *Glasse*.

16

Experiments in Consort touching *Iudicious & Accurate Infusions*, both in *Liquors*, and *Aire*.

17 IN *Bodies* containing Fine Spirits, which doe easily dissipate, when you make *Infusions*, the Rule is; A short Stay of the *Body* in the *Liquour* receyveth the Spirit; And a longer Stay confoundeth it; because it draweth forth the Earthy Part withall; which embaseth the finer. And therfore it is an Errour in *Physicians*, to rest simply upon the Length of stay, for encreasing the vertue. But if you will have the *Infusion* strong, in those kind of *Bodies*, which have fine Spirits, your way is, not to give Longer time, but to repeat the *Infusion* of the *Body* ofner. Take *Violetts*, and infuse a good Pugill of them in a Quart of Vineger; Lett them stay three quarters of an houre, and take them forth; And refresh the *Infusion* with like quantity of new *Violets*, seven times; And it will make a Vineger so fresh of the *Flower*, as if a Twelve-moneth after, it be brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the Flower, a good which after, then at first.

18 This Rule, which we have given, is of singular use, for the Preparations of *Medicines*, and other *Infusions*. As for Example; the Leafe of *Burrage* hath an Excellent Spirit, to represse the fuliginous Vapour of Dusky Melancholy, and so to cure Madnes: But nevertheless, if the Leafe be infused long, it yeeldeth forth but a raw substance, of no Vertue: Therefore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it be Tunned, the *Burrage* stay a small time, and be often changed with fresh; It will make a Soveraigne Drink for Melancholy Passions. And the like I conceive of *Orenge Flowers*.

19 *Rubarb* hath manifestly in it Parts of contrary Operations: Parts that purge; And parts that binde the body: And the first lay looser, and the latter lay deeper: So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and bind the Body lesse after the purging, than if it stood twenty foure houres; This is tried: But I conceive likewise, that by Repeating the *Infusion* of *Rubarb*, severall times, (as was said of Violetts,) letting each stay in but a small time; you may make it as strong a *Purging Medicine*, as *Scammony*. And it is not a small thing wonn in *Physick*, if you can make *Rubarb*, and other *Medecine*

cines that are *Benedict*, as ſtrong Purgers, as thoſe that are not without ſome Maligoity.

20 *Purging Medicines*, for the moſt part, have their *Purgative* Vertue, in a fine Sririt ; As apreareth by that they indure not boiling, without much loſſe of vertue. And therefore it is of good uſe in *Phyſick*, if you can retaine the *Purging* Vertue, and take away the Unpleaſant taſte of the *Purger* ; which it is like you may doe, by this Courſe of *Infuſing* oft, with little ſtay. For it is probable, that the Horrible and Odious Taſte, is in the Groſſer part.

21 Generally, the working by *Infuſions*, is groſſe and blind, except you firſt try the Iſſuing of the ſeverall Parts of the Body, which of them Iſſue more ſpeedily, and which more ſlowly ; And ſo by apportioning the time, can take and leave that Quality, which you deſire. This to know, there be two waies; The one to try what long ſtay, & what ſhort ſtay worketh, as hath been ſaid : The other to try in Order, the ſucceeding *Infuſions*, of one and the ſame Body, ſucceſſively, in ſeverall *Liquours*. As for example ; Take *Orenge-Pills*, or *Roſe-Mary*, or *Cinnamon*, or what you will ; And let them *Infuſe* halfe an houre in *water* : Then take them out; and *Infuſe* them againe in other *water* ; And ſo the third time : And then taſte and conſider the *firſt water*, the *Second*, and the *Third* : And you will find them differing, not only in Strength and Weaknes, but otherwiſe in Taſte, or Odour ; For it may bee the *Firſt water* will have more of the Sent, as more Fragrant ; And the *Second* more of the Taſte, as more bitter or Biting, &c.

22 *Infuſions* in *Aire*, (for ſo we may well call *Odours*) have the ſame diverſities with *Infuſions* in *water* ; In that the ſeverall *Odours* (which are in one Flower, or other Body) iſſue at ſeverall times ; Some earlier, ſome later : So we find that *Violets*, *Woodbines*, *Strawberries*, yeeld a pleaſing Sent, that commeth forth firſt ; But ſoone after an ill Sent quite differing from the Former. Which is cauſed, not ſo much by Mellowing, as by the late Iſſuing of the Groſſer Spirit.

23 As we may deſire to extract the fineſt Spirits in ſome Caſes ; So we may deſire alſo to diſcharge them (as hurtfull) in ſome other. So *wine burnt*, by reaſon of the Evaporating of the finer Spirit, enflameth leſſe, and is beſt in Agues : *Opium* leeſeth ſome of his poiſonous Quallity, if it be vapoured out, mingled with *Spirit* of *Wine*, or the like: *Sean* leeſeth ſomewhat of his windines by Decocting; And (generally) ſubtile or windy Spirits are taken off by Incenſion, or Evaporation. And even in *Infuſions* in things that are of too high a Spirit, you were better poure off the firſt *Infuſion*, after a ſmall time, and uſe the latter.

Experiment Solitary touching the *Appetite* of *Continuation in Liquids*. 24

BUbbles are in the forme of an *Hemiſphere* ; *Aire* within, and a little Skin of *water* without : And it ſeemeth ſomewhat ſtrange, that the *Aire* ſhould riſe ſo ſwiftly, while it is in the *water* ; And when it commeth to the top, ſhould be ſtaid by ſo weake a Cover as that of the *Bubble* is. But as for the ſwift Aſcent of the *Aire*, while it is under the

the *water*, that is a *Motion* of *Percuſſion* from the *water* ; which it ſelfe deſcending, driveth up the Aire ; and no *Motion* of *Levity* in the *Aire*. And this *Democritus* called *Motus Plagæ*. In this Common *Experiment*, the Cauſe of the Encloſure of the *Bubble* is, for that the Appetite to reſiſt Separation, or Diſcontinuance, (which in ſolide *Bodies* is ſtrong) is alſo in *Liquours*, though fainter and weaker ; As wee ſee in this of the *Bubble*: we ſee it alſo in little Glaſſes of Spittle that children make of Ruſhes ; And in Caſtles of Bubbles, which they make by blowing into *water*, having obtained a little Degree of Tenacity by Mixture of Soape : Wee ſee it alſo in the *Stillicides* of *water*, which if there be *water* enough to follow, will Draw themſelves into a ſmall thred, becauſe they will not diſcontinue ; But if there be no Remedy, then they caſt themſelves into round Drops ; which is the Figure, that ſaveth the Body moſt from Diſcontinuance : The ſame Reaſon is of the Roundnes of the *Bubble*, as well for the Skin of *water*, as for the *Aire* within : For the *Aire* likewiſe avoideth *Diſcontinuance* ; And therfore caſteth it ſelfe into a round Figure. And for the ſtopp and Arreſt of the *Aire* a little while, it ſheweth that the *Aire* of it ſelfe hath little, or no Appetite, of Aſcending.

THE Rejection, which I continually uſe, of *Eperiments*, (though it appeareth not) is infinit ; But yet if an *Experiment* be probable in the Worke, and of great Uſe, I receive it, but deliver it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus : Find out a hanging Ground, where there is a good quick Fall of Raine-water. Lay a Halfe-Trough of Stone, of a good length, 3: or 4. foote deepe within the ſame Ground ; with one end upon the high Ground, the other upon the low. Cover the Trough with Brakes a good thicknes, and caſt Sand upon the Top of the Brakes : You ſhall ſee, (ſaith he) that after ſome ſhowers are paſt, the lower End of the Trough will run like a *Spring* of *water* : which is no marvaile, if it hold, while the Raine-water laſteth; But he ſaid it would continue long time after the Raine is paſt : As if the water did multiply it ſelfe upon the Aire, by the helpe of the Coldneſſe & Condenſation of the Earth, and the Conſort of the firſt Water.

Experiment Solitary touching the Making of *Artificiall Springs*. 25

THE *French*, (which put off the Name of the *French Diſeaſe* ; unto the Name of the *Diſeaſe* of *Naples*,) doe report, that at the Siege of *Naples*, there were certaine wicked Merchants that Barrelled up *Mans fleſh*, (of ſome that had beene lately ſlaine in *Barbary*) and ſold it for *Tunny* ; And that upon that foule and high Nouriſhment, was the Originall of that *Diſeaſe*. Which may well be ; For that it is certaine, that the *Caniballs* in the *weſt Indies*, eat *Mans fleſh* ; And the *weſt Indies* were full of the Pockes when they were firſt diſcovered : And at this day the *Mortaleſt poiſons*, practiſed by the *weſt Indians*, have ſome Mixture of the Bloud, or Fat, or Fleſh of *Man* : And divers Witches, and

Experiment Solitary touching the *Venemous Quality* of *Mans Fleſh*. 26

Sorcereſſes, as well amongſt the *Heathen*, as amongſt the *Chriſtians*, have fed upon *Mans fleſh*, to aid (as it ſeemeth) their Imagination, with High and foule Vapours.

Experiment Solitary touching the *Verſion* and *Tranſmutation* of *Aire* into *Water*. 27

IT ſeemeth that there be theſe waies (in likelihood) of *Verſion* of *Vapours* or *Aire*, into *water* and *Moiſture*. The firſt is *Cold*; which doth manifeſtly Condenſe; As wee ſee in the *Contracting of the Aire* in the *weather-Glaſſe*; whereby it is a Degree nearer to *Water*. Wee ſee it alſo in the *Generation of Springs*, which the *Ancients* thought (very probably) to be made by the *Verſion* of *Aire* into *water*, holpen by the *Reſt*, which the *Aire* hath in thoſe Parts; whereby it cannot diſſipate. And by the *Coldnes* of *Rockes*; for there *Springs* are chiefly generated. Wee ſee it alſo in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dews*, and *Raines*. And the Experiment of Turning *water* into *Ice*, by Snow, Nitre, and Salt, (whereof wee ſhall ſpeake hereafter,) would be transferred to the Turning of *Aire* into *Water*. The Second way is by *Compreſſion*; As in *Stillatories*, wher the Vapour is turned back, upon it ſelfe, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* upon the Covers of *Boyling Pots*; And in the *Dew* towards *Raine*, upon *Marble*, and *Wainſcot*. But this is like to doe no great effect; Except it be upon Vapours, and groſſe *Aire*, that are already very neere in Degree to Water. The Third is that, which may be ſearched into, but doth not yet appeare; which is, by *Mingling* of *moiſt Vapours* with *Aire*; And trying if they will not bring a Returne of more *water*, than the *water* was at firſt: For if ſo; That Increaſe is a *verſion* of the *Aire*: Therefore put water into the Bottome of a *Stillatory*, with the Neb ſtopped; Weigh the *water* firſt; Hang in the Middle of the *Stillatory* a large *Spunge*; And ſee what Quantitie of *water* yon can cruſh out of it; And what it is more, or leſſe, compared with the *water* ſpent; For you muſt underſtand, that if any *Verſion* can be wrought, it will be eaſilieſt done in ſmall Pores: And that is the Reaſon why wee preſcribe a *Spunge*. The Fourth way is Probable alſo, though not Appearing; Which is, by *Receiving the Aire* into the ſmall *Pores of Bodies*; For (as hath been ſaid) every thing in ſmall Quantity is more eaſie for *verſion*; And Tangible Bodies have no pleaſure in the Conſort of *Aire*, but endeavour to ſubact it into a more *Denſe Body*: But in *Entire Bodies* it is checked; becauſe if the *Aire* ſhould Condenſe, there is nothing to ſucceed: Therefore it muſt be in *looſe Bodies*, as *Sand*, and *Powder*; which wee ſee, if they lye cloſe, of themſelves gather Moiſture.

Experiment Solitary touching *Helps* towards the *Beauty* and good *Features* of *Perſons*. 28

IT is reported by ſome of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put Young, into ſuch a Cage, or Box, as they cannot riſe to their Stature, but may encreaſe in Breadth, or length; will grow accordingly, as they can get Roome: which if it be true, and faiſible, and that the young *Creature* ſo preſſed, and ſtraightened, doth not therupon die; It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange figure. This is certaine, and noted long ſince; That the Preſſure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Macrocephali*; which ſhape of the Head, at that time, was eſteemed. And the Raiſing gently of the Bridge of the Noſe, doth prevent the Deformity of a Saddle Noſe. Which obſervation well weighed, may teach a Meanes, to make the Perſons of Men, and Women, in many kindes, more comely, and better featured, than otherwiſe they would be; By the Forming and Shaping of them in their Infancy: As by Stroaking up the Calves of the Leggs, to keepe them from falling downe too lowe; And by Stroaking up the Forehead to keepe them from being low-foreheaded. And it is a common Practice to ſwath Infants, that they may grow more ſtraight, and better ſhaped: And wee ſee Young Women, by wearing ſtraight Bodies, keepe themſelves from being Groſſe, and Corpulent.

Experiments Solitary touching the *Condenſing* of *Aire*, in ſuch ſort as it may put on *Weight*, and yeeld *Nouriſhment*. 29

ONions, as they hang, will many of them ſhoot forth; And ſo will *Penniroiall*; And ſo will an Herb called *Orpin*; with which they uſe, in the Country, to trimme their Houſes, binding it to a Lath, or Stick, and ſetting it againſt a wall. Wee ſee it likewiſe, more eſpecially, in the greater *Semper-vive*, which will put out Branches, two or three yeares: But it is true, that commonly they wrapp the Root in a Cloth beſmeared with *Oyle*, and renue it once in halfe a Yeare. The like is reported by ſome of the *Ancients*, of the *Stalks of Lillies*. The Cauſe is; For that theſe *Plants* have a Strong, Denſe, and Succulent Moiſture, which is not apt to exhale; And ſo is able, from the old ſtore, without drawing helpe from the Earth, to ſuffice the ſprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the Times of Putting forth. Wee ſee alſo, that *Stumps* of *Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Conſequence, to try whether theſe things, in the Sprouting, doe increaſe *Weight*; which muſt be tried, by weighing them before they bee hangd up; And afterwards againe, when they are ſprouted. For if they encreaſe not in *weight*; Then it is no more but this; That what they ſend forth in the Sprout, they leeſe in ſome other Part: But if they gather *Weight*, then it is *Magnale Naturæ*; For it ſheweth that *Aire* may bee made ſo to bee Condenſed, as to bee converted into a *Denſe Body*; wheras the Race and Period of all things, here above the Earth, is to extenuate and turne things to bee more *Pneumaticall*, and Rare, And not to bee Retrograde, from *Pneumaticall* to that which is *Denſe*. It ſheweth alſo, that *Aire* can *Nouriſh*; which is another great Matter of Conſequence. Note, that to try this, the *Experiment* of the *Semper-vive* muſt bee made without Oiling the Cloth; For elſe, it may be, the *Plant* receiveth Nouriſhment from the Oile.

Experiment Solitary touching the *Commixture* of *Flame* and *Aire*, and the *great Force* thereof.

30

Flame and *Aire* doe not Mingle, except it be in an *Inſtant*; Or in the *vitall Spiritts* of *vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath beene aſcribed, to Rarefaction of the Earthy Subſtance into *Flame*; And thus farre it is true: And then (forſooth) it is become another Element; the Forme whereof occupieth more place; And ſo, of Neceſſity, followeth a Dilatation: And therefore, leſt two Bodies ſhould be in one place, there muſt needes alſo follow an Expulſion of the pellet; Or Blowing up of the Mine. But theſe are Crude and Ignorant Speculations. For *Flame*, if there were nothing els, except it were in very great quantity, will bee ſuffocate with any hard Body, ſuch as a Pellet is, Or the Barrell of a Gunn; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not ſuffer it to kindle, or ſpread. But the Cauſe of this ſo potent a Motion, is the *Nitre*, (which wee call otherwiſe *Salt-Petre*;) which having in it a notable Crude and windy *Spirit*, firſt by the *Heate* of the *Fire* ſuddainly dilateth it ſelf; (And wee know that ſimple *Aire*, being preternaturally attenuated by *Heate*, will make it ſelfe Roome, and breake and blow vp that which reſiſteth it;) And Secondly, when the *Nitre* hath dilated it ſelf, it bloweth abroad the *Flame*, as an inward Bellowes. And therefore we ſee that *Brimſtone*, *Pitch*, *Camphire*, *Wilde-Fire*, and divers other Inflammable Matters, though they burne cruelly, and are hard to quench; Yet they make no ſuch fiery winde, as *Gunpowder* doth: And on the other ſide, wee ſee that *Quick-Silver*, (which is a moſt Crude and Watry *Body*) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certaine, their *Vitall Spiritts* are a Subſtance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a *Body* that hath ſome fixing, they will. For that you may beſt ſee in thoſe two Bodies, (which are their *Aliments*,) *water*, and *Oyle*: For they likewiſe will not well mingle of themſelves, but in the Bodies of *Plants*, and *Living Creatures*, they will. It is no marvaile therfore, that a ſmall *Quantity* of *Spiritts*, in the Cells of the Braine, and Cannales of the Sinewes, are able to moue the whole Body, (which is of ſo great Maſſe,) both with ſo great Force, as in Wreſtling, Leaping; And with ſo great Swiftnes, As in playing Diviſion upon the *Lute*. Such is the force of theſe two Natures, *Aire* and *Flame*, when they incorporate.

Experiment Solitary touching the *Secret Nature* of *Flame*.

31

TAke a ſmall *wax Candle*, and put it in a Socket, of Braſſe, or Iron; Then ſett it upright in a Porringer full of *Spiritt of Wine*, heated: Then ſett both the *Candle*, and *Spiritt of Wine*, on fire, and you ſhall ſee the *Flame* of the *Candle*, open it ſelf, and become 4. or 5. times bigger than otherwiſe it would have been; and appeare in Figure *Globular*, and not in *Piramis*. You ſhall ſee alſo, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not waxe any whitt blewe towards the Colour of the Outward *flame* of the *Spiritt of wine*. This is a Noble *Inſtance*;

Inſtance; wherein two things are moſt remarkable; The one; that one *Flame* within another quencheth not; but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would ſtill aſcend upwards in one greatneſſe, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Riſe. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but only remaineth contiguous, As it commeth to paſſe betwixt Conſiſting Bodies. It appeareth alſo, that the forme of a Piramis in *Flame*, which we vſually ſee, is meerely by Accident, and that the *Aire* about, by quenching the Sides of the *Flame*, cruſheth it, and extenuateth it into that Forme; For of it ſelfe it would bee Round: And therefore *Smoake* is in the Figure of a Piramis Reverſed; For the *Aire* quencheth the *Flame*, and receiveth the *Smoake*. Note alſo, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and move upwards, but moveth waving, and to and fro: As if *Flame* of his owne Nature (if it were not quenched,) would rowle and turne, as well as move upwards. By all which it, it ſhould ſeeme, that the Cæleſtiall Bodies, (moſt of them,) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and Determinate; They have Rotation; And they have the Colour and Splendour of *Flame*: So that *Flame* above is Durable, and Conſiſtent, and in his Naturall place; But with us, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

TAke an *Arrow*, and hold it in *Flame*, for the ſpace of ten pulſes; And when it commeth forth, you ſhall finde thoſe Parts of the *Arrow*, which were on the Outſides of the *Flame*, more burned, blacked, & turned almoſt in to a Coale; whereas that in the Middeſt of the *Flame*, will be, as if the Fire had ſcarce touched it. This is an *Inſtance* of great conſequence for the diſcovery of the Nature of *Flame*; And ſheweth manifeſtly, that *Flame* burneth more violently towards the Sides, than in the Middeſt: And, which is more, that *Heat* or *Fire* not violent or furious, but where it is checked and pent. And therfore the *Peripatetickes* (howſoever their opinion of an *Element* of *Fire* above the *Aire* is juſtly exploded;) in that Point they acquit themſelves well: For being oppoſed, that if there were a *Spheare* of *Fire*, that incompaſſed the Earth ſo neare hand, it were impoſſible but all things ſhould be burnt up; They anſwer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

Experiment Solitary touching the *Diſferent force* of *Flame* in the *Middeſt* and on the *Sides*.

32

IT is affirmed conſtantly by mãy, as an uſuall Experiment; That a *Lumpe* of *Vre*, in the *Bottome* of a Mine, will bee tumbled, and ſtirred, by two Mens ſtrength; which if you bring it to the *Topp* of the *Earth*, will aske Six Mens ſtrength at the leaſt to ſtirre it. It is a Noble *Inſtance*, and is fit to be tried to the full: For it is very probable, that the *Motion* of

Experiment Solitary touching the *Decreaſe* of the *Naturall motion* of *Gravity* in *great diſtance from the Earth*; or *within ſome depth of the Earth*.

33

of Gravitie worketh weakly, both farre from the Earth, and alſo within the Earth: The former, becauſe the Appetite of Union of Denſe Bodies with the Earth, in reſpect of the diſtance, is more dull; The latter, becauſe the Body hath in part attained his Nature, when it is ſome Depth in the Earth. For as for the Moving to a *Point* or Place (which was the Opinion of the *Ancient*) it is a meere Vanity.

Experiment Solitary touching the *Contraction* of *Bodies* in *Bulke*, by the *Mixture* of the more *Liquid Body* with the more *Solid*.

34

IT is ſtrange, how the *Ancients* tooke up *Experiments* upon credit, and yet did build great Matters upon them. The Obſervation of ſome of the beſt of them, delivered confidently is, That a *Veſſell* filled with *Aſhes*, will receive the like quantity of *water*, that it would have done, if it had been empty. But this is utterly untrue; for the *water* will not goe in by a Fifth part. And I ſuppoſe, that that Fifth part is the difference of the lying cloſe, or open, of the *Aſhes*; As wee ſee that *Aſhes* alone, if they be hard preſſed, will lye in leſſe roome: And ſo the *Aſhes* with Aire betweene, lye looſer; and with *water*, cloſer. For I have not yet found certainly, that the *water*, it ſelfe, by mixture of *Aſhes*, or *Duſt*, will ſhrinke or draw into leſſe Roome.

Experiment Solitary touching the *Making Vines more fruitfull*.

35

IT is reported of credit, that if you lay good ſtore of *Kernells* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier and proſper better. It may bee tried with other *Kernells*, laid about the *Root* of a *Plant* of the ſame kinde; As *Figgs*, *Kernells* of *Apples*, &c. The Cauſe may bee, for that the *Kernells* draw out of the Earth Juice fit to nouriſh the *Tree*, as thoſe that would be *Trees* of themſelves, though there were no *Root*; But the *Root* being of greater ſtrength, robbeth and devoureth the Nouriſhment, when they have drawne it: As great *Fiſhes* devoure little.

Experiments in Conſort touching *Purging Medicines*.

36

THe *Operation* of *Purging Medicines*, and the *Cauſes* thereof, have been thought to be a great Secret; And ſo according to the ſlothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Qualitie*, and the like Shifts of Ignorance. The *Cauſes* of *Purging* are diuers; All plaine and perſpicuous; And throughly maintained by Experience. The firſt is, That whatſoever cannot bee overcome and diſgeſted by the *Stomacke*, is by the *Stomacke*, either put up by *Vomit*, or put downe to the *Guts*; And by that *Motion* of *Expulſion* in the *Stomacke*, and *Guts*, other *Parts of the Body*, (as the *Orifices* of the *Veines*, and the like) are moved to expell by *Conſent*. For nothing is more frequent than *Motion of Conſent* in the Body of Man. This Surcharge of the *Stomacke*, is cauſed either by the *Qualitie* of the *Medicine*, or by the *Quantitie*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquintida*, &c. *Loathſome* and of horrible taſt; As in *Agarick*, *Black Hellebore*, &c. And of *ſecret Malignity*, and diſagreement towards *Mans Bodie*, many times not appearing much in the Taſte; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine* that

that *Purgeth*, and hath neither of the firſt two *Manifeſt Qualities*; it is to bee held ſuſpected, as a kinde of *Poyſon*; For that it worketh either by *Corroſion*; or by a *ſecret Malignitie* and Enmitie to *Nature*: And therefore ſuch *Medicines* are warily to bee prepared, and uſed. The *Quantitie* of that which is taken, doth alſo cauſe *Purging*; As wee ſee in a great *Quantitie* of *New Milke* from the Cow; yea and a great *Quantitie of Meat*; For *Surfets* many times turne to *Purges*, both upwards, and downwards. Therfore we ſee generally, that the working of *Purging Medicines*, commeth two or three houres after the *Medicines* taken; For that the *Stomacke* firſt maketh a proofe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantitie*.

A ſecond *Cauſe* is *Mordication* of the *Orifices* of the *Parts*; Eſpecially of the *Meſentery veines*; As it is ſeene, that *Salt*, or any ſuch thing that is ſharpe and biting, put into the Fundament, doth provoke the Part to expell; And *Muſtard* provoketh Sneezing: And any Sharpe Thing to the Eyes, provoketh Teares. And therefore we ſee that almoſt all *Purgers* have a kinde of *Twiching* and *vellication*, beſides the *Griping* which commeth of wind. And if this *mordication* bee in an ouer-high Degree, it is little better than the *Corroſion* of *Poyſon*; And it commeth to paſſe ſometimes in *Antimony*; Eſpecially if it be given, to Bodies not repleat with Humors; For where Humors abound, the Humors ſave the Parts. 37

The third *Cauſe* is *Attraction*: For I doe not deny, but that *Purging Medicines* have in them a direct Force of *Attraction*; As *Drawing Plaſters* have in *Surgery*: And wee ſee *Sage*, or *Bettony bruſed*, *Sneezing-powder*, and other *Powders* or *Liquors* (which the *Phyſitians* call *Errhines*,) put into the Noſe, draw Flegme, and water from the Head; And ſo it is in *Apophlegmatiſmes*, and *Gargariſmes*, that draw the Rheume downe by the Pallate. And by this Vertue, no doubt, ſome *Purgers* draw more one Humour, and ſome another, according to the Opinion received: As *Rubarb* draweth Choller; *Sean* Melancholy; *Agarick* Flegme; &c. But yet, (more or leſſe) they draw promiſcuouſly. And note alſo, that beſides Sympathy, between the *Purger* and the *Humour*, there is alſo another Cauſe, why ſome *Medicines* draw ſome Humour more than another. And it is, for that ſome *Medicines* work quicker than others: And they that draw quick, draw only the Lighter, and more fluide Humours; they that draw ſlow, worke upon the more Tough, and Viſcous Humours. And therfore Men muſt beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh onely the Lighteſt part of the Humour away, and leaveth the Maſſe of Humours more obſtinate. And the like may be ſaid of *Worme-wood*, which is ſo much magnified. 38

The fourth *Cauſe* is *Flatuoſity*; For *wine* ſtirred moveth to expell: And wee finde that (in effect) all *Purgers* have in them a raw *Spirit*, or *wind*; which is the Principall *Cauſe* of *Tortion* in the *Stomach*, and *Belly*. And therefore *Purgers* leeſe (moſt of them) the vertue, by Decoction upon the Fire; And for that Cauſe are given chiefly in Infuſion, Juyce, or Powder. 39

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40 The fifth *Cause* is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *Spunge*: So we see that *Taking Cold* moveth Loosenesse by Contraction of the skinn, and outward Parts; And so doth *Cold* likewise cause Rheumes, and Defluxions from the Head; And some *Astringent Plasters* crush out purulent Matter. This kind of Operation is not found in many *Medicines*: *Mirabolanes* have it; And it may bee the *Barkes of Peaches*; For this Vertue requireth an *Astriction*; but such an *Astriction*, as is not gratefull to the Body; (For a pleasing *Astriction* doth rather Binde in the Humours, than Expell them:) And therefore such *Astriction* is found in Things of an Harrish Taste.

41 The Sixth *Cause* is *Lubrefaction*, and *Relaxation*. As wee see in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallowes*, *Lettuce*, *Mercuriall*, *Pelletory of the Wall*, and others. There is also a secret Vertue of *Relaxation* in *Cold*: For the *Heat* of the Body bindeth the Parts and Humours together, which *Cold*, relaxeth: As it is seene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, Breake, and dissolve. And by this kinde of *Relaxation*, *Feare* looseneth the Belly; because the Heat retiring inwards towards the Heart, the Gutts and other Parts are relaxed; In the same manner as *Feare* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42 The Seventh *Cause* is *Abstersion*; which is plainly a *Scouring off*, or *Incision* of the *more viscous Humors*, and making the *Humors* more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (speedily) from the Foulenesse. But this *Incision* must bee by a *Sharpnesse*, without *Astriction*: Which wee finde in *Salt*, *Worm-wood*, *Oxymel*, and the like.

43 There bee *Medicines*, that move *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stoole*, are such as enter not at all, or little into the *Mesentery Veines*, But either at the first are not digestible by the *Stomach*, and therefore move immediatly downwards to the *Gutts*, Or else are afterwards rejected by the *Mesentery Veines*, and so turne likewise downwards to the *Gutts*; and of these two kindes are most *Purgers*. But those that move *Vrine*, are such, as are well digested of the *Stomach*, and well received also of the *Mesentery Veines*; So they come as farre as the *Liver*, which sendeth *Vrine* to the *Bladder*, as the *Whey of Bloud*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liver*, in sending downe the wheyey Part of the Bloud to the *Reines*. For *Medicines Vrinative* doe not worke by Rejection, and Indigestion, as *Solutive* doe.

44 There bee divers *Medicines*, which in greater *Quantity*, move *Stooles*, and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantity*, move *Vrine*, and in Smaller, *Stoole*. Of the former sort is *Rubarb*, and some others. The *Cause* is, for that *Rubarb* is a *Medicine*, which the Stomach in a small Quantity doth digest, and overcome, (being not Flatuous, nor Loathsome;) and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater Quantitie, the

the *Stomach* cannot overcome it, and so it goeth to the *Gutts*. *Pepper* by some of the *Ancients* is noted to bee of the second sort; which being in small *Quantity*, moveth wind in the Stomach and Gutts, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *wind*; And it selfe getteth to the *Mesentery veines*; And so to the *Liver*, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

Experiments in Consort touching *Meats* and *Drinks* that are *most Nourishing*.

45 WE have spoken of *Evacuating* of the *Body*; we wil now speak something of the *Filling* of it by *Restoratives* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one Part that is more Nourishing than an other, As *Graines*, and *Roots* nourish more, than the *Leaves*; In so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding Leaves unable to Nourish Mans Body. Whether there be that difference in the Flesh of *Living Creatures*, is not well inquired: As whether *Livers*, and other *Entrails*, be not more Nourishing, than the *Outward Flesh*. We find that amongst the *Romans*, a *Gooses Liver* was a great Delicacy; In so much as they had Artificiall Meanes to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceive that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would bee a very *Nourishing Broth*: Wee finde also that *Scotch Skinck*, (which is a Pottage of strong Nourishment,) is made with the *Knees*, and *Sinewes* of *Beefe*, but long boiled: *Ielly* also, which they vse for a Restorative, is chiefly made of *Knuckles* of *Veale*. The *Pulp* that is within the *Crafish* or *Crab*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crab*, or *Crafish*. The *Yolkes* of *Egges* are clearely more Nourishing than the *whites*. So that it should seeme, that the Parts of *Living Creatures*, that lye more Inwards, nourish more than the Outward Flesh: Except it bee the *Braine*; which the Spirits prey too much upon, to leave it any great Vertue of Nourishing. It seemeth for the Nourishing of Aged Men, or Men in Consumptions, some such thing should be Devised, as should be halfe *Chylus*, before it be put into the Stomach.

Take two large *Capons*; perboile them upon a soft fire, by the space of an houre, or more, till in effecte all the Bloud be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shankes*, and throw them away. Then with a good strong Chopping-knife, mince the two *Capons*, bones and all, as small as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, sweet, and well seasoned, of foure gallons of Beere, of 8.s. strength, new as it commeth from the Tunning; Make in the Kilderkin a great Bung-hole of purpose: Then thrust into it, the Boulter (in which the *Capons* are) drawne out in length; Let it steepe in it three Dayes, and three Nights, the Bung-hole open, to worke; Then close the Bung-hole, and so let it continue, a Day and an halfe; Then

46 draw

draw it into bottles, and you may drinke it well after three dayes Botteling; And it will laſt ſix weeks (approved.) It drinketh freſh, flowreth and mantleth exceedingly; It drinketh not neweſh at all; It is an excellent Drinke for a Conſumption, to be drunke either alone, or Carded with ſome other Beere. It quencheth Thirſt, and hath no whit of windineſſe. Note, that it is not poſſible, that Meat and Bread, either in Broths, or taken with Drink, as is uſed, ſhould get forth into the veines, and outward Parts, ſo finely, and eaſily, as when it is thus Incorporate, and made almoſt a *Chylus* aforehand.

47 Triall would bee made of the like Brew with *Potado Roots*, or *Burr Rootes*, or the *Pith* of *Artichoakes*, which are nouriſhing Meats: It may be tried alſo, with other fleſh; As *Pheſant*, *Partridge*, *Young Porke*, *Pigge*, *Veniſon*, eſpecially of *young Deere*, &c.

48 A *Mortreſſe* made with the *Brawne* of *Capons*, ſtamped, and ſtrained, and mingled (after it is made) with like quantitie, (at the leaſt,) of *Almond Butter*; is an excellent Meat to Nouriſh thoſe that are weake, Better than *Blanck-Manger*, or *Jelly*: And ſo is the *Cullice* of *Cockes*, boyled thick with the like Mixture of *Almond Butter*: For the *Mortreſſe*, or *Cullice*, of it ſelfe, is more Savoury and ſtrong; And not ſo fit for Nouriſhing of weake Bodies; But the *Almonds* that are not of ſo high a taſte as *Fleſh*, doe excellently qualifie it.

49 *Indian Maiz* hath (of certaine) an excellent Spirit of Nouriſhment; But it muſt bee throughly boyled, and made into a *Maiz-Creame* like a *Barley Creame*. I judge the ſame of *Rize*, made into a Creame; For *Rize* is in *Turky*, and other Countries of the Eaſt, moſt fed upon; But it muſt be throughly boyled in reſpect of the Hardneſſe of it: And alſo becauſe otherwiſe it bindeth the Body too much.

50 *Piſtachoes*, ſo they be good, and not muſty, joyned with *Almonds* in *Almond Milke*; Or made into a *Milke* of themſelves, like unto *Almond Milke*, but more greene, are an excellent Nouriſher. But you ſhall doe well, to adde a little *Ginger*, ſcraped, becauſe they are not without ſome ſubtill windineſſe.

51 *Milke* warme from the Cow, is found to be a great Nouriſher, and a good Remedy in *Conſumptions*: But then you muſt put into it, when you milke the Cowe, two little bagges; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roſes*; For they keepe the *Milke* ſomewhat from Turning, or Crudling in the ſtomach; And put in Suggar alſo, for the ſame cauſe, and partly for the Taſts ſake; But you muſt drinke a good draught that it may ſtay leſſe time in the ſtomach, leſt it Cruddle: And let the Cup into which you milke the Cow, bee ſet in a greater Cup of hot water, that you take it warme. And *Cow-milke* thus prepared, I judge to be better for a *Conſumption*, than *Aſſe-milke*, which (it is true) turneth not ſo eaſily, but it is a little harriſh; Marry it is more proper for Sharpneſſe of Vrine, and Exulceration of the Bladder, and all manner of Lenifyings. *womans milke* likewiſe is preſcribed, when all faile; but I commend it not; as being a little too neere the Juyce of Mans Bo-

dy;

dy, to bee a good Nouriſher; Except it be in *Infants*, to whom it is Naturall.

52 *Oyle* of *Sweet Almonds*, newly drawne, with *Sugar*, and a little *Spice*, ſpread upon Bread toſted, is an Excellent Nouriſher; But then to keepe the *Oyle* from frying in the Stomach, you muſt drinke a good draught of Milde Beere after it; And to keepe it from relaxing the Stomach too much; you muſt put in a little Powder of Cinnamon.

53 The *Yolkes* of *Egges* are of themſelves ſo well prepared by Nature for Nouriſhment; As (ſo they be Potched, or Reare boiled) they need no other Preparation, or Mixture; yet they may be taken alſo rawe, when they are new laid, with *Malmeſey*, or *Sweet wine*; You ſhall doe well to put in ſome few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, beſides the immediate Facultie of Nouriſhment, ſuch Drinke will ſtrengthen the Backe; So that it will not draw downe the *Vrine* too faſt; For too much *Vrine* doth alwaies hinder Nouriſhment.

54 *Mincing of meat*, as in *Pies*, and *buttered Minced Meat*, ſaveth the Grinding of the Teeth; And therefore, (no doubt) it is more Nouriſhing; Eſpecially in Age, Or to them that have weake Teeth; But the Butter is not ſo proper for weake Bodies; And therefore it were good to moiſten it with a little *Claret wine*, Pill of *Limon*, or *Orenge*, cut ſmall, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuetts*, which are likewiſe minced Meat, in ſtead of Butter, and Fat, it were good to moiſten them, partly with *Creame*, or *Almond*, or *Piſtachomilke*; or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reſerve to the due place.

Wee have hitherto handled the Particulars *which yeeld beſt, and eaſieſt, and plentifulleſt Nouriſhment; And now wee will ſpeake of the beſt* Meanes *of Conveying, and Converting the Nouriſhment.*

55 The Firſt *Meanes* is, to procure that the *Nouriſhment* may not be robbed, and drawen away; wherein that, which we have already ſaid, is very Materiall; To provide, that the *Reines* draw not too ſtrongly an over-great Part of the *Bloud* into *Vrine*. To this adde that Precept of *Ariſtotle*, that *Wine* be forborne in all *Conſumptions*; For that the *Spirits* of the *wine*, doe prey upon the Roſcide Juyce of the Body, and inter-common with the Spirits of the Body, and ſo deceive and robbe them of their Nouriſhment. And therefore if the *Conſumption* growing from the weakneſſe of the Stomach, doe force you to uſe *Wine*; let it alwaies be burnt; that the Quicker Spirits may evaporate; or at the leaſt quenched with two little wedges of Gold, ſix or ſeven times repeated. Adde alſo this Proviſion, That there be not too much *Expence* of the *Nouriſhment*, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to ſweat, it muſt be gently reſtrained. But chiefly *Hippocrates* Rule is to bee followed; who adviſeth quite contrary to that which is in uſe: Namely, that the *Linnen*, or *Garment* next the Fleſh, be in Winter drie, and oft

changed; And in Summer seldome changed, and smeared over with Oyle; For certaine it is, that any Substance that is fat, doth a little fill the Pores of the Body, and stay Sweat, in some Degree. But the more cleanly way is, to have the *Linnen* smeared lightly over, with *Oyle* of *Sweet Almonds*; And not to forbeare shifting as oft as is fit.

56 The Second *Meanes* is, to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must be by *Strengthening* of the *Stomach*; And in this, because the *Stomach* is chiefly comforted by *Wine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the *Stomach*: Wherein it hath beene tried, that the *Quilts* of *Roses*, *Spices*, *Mastick*, *Wormewood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Alegant*; And to drie it; And after it bee dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the Stomach: For it is certaine, that all Flower hath a potent Vertue of *Astriction*, In so much as it hardeneth a peece of flesh, or a Flower that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lye long.

57 The Third *Meanes* (which may be a Branch of the former) is to send forth the *Nourishment* the better by *Sleepe*. For we see, that Beares, and other *Creatures* that *sleepe* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleeved) that *Sleepe* doth Nourish much; Both for that the Spirits doe lesse spend the Nourishment in *Sleepe*, than when living *Creatures* are awake: And because (that which is to the present purpose) it helpeth to thrust out the Nourishment into the Parts. Therefore in Aged men, and weake Bodies, and such as abound not with Choller, a short *Sleepe* after dinner doth helpe to Nourish; For in such Bodies there is no feare of an over-hastie Digestion, which is the Inconvenience of Postmeridian *Sleepes*, *Sleepe* also in the Morning after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further Nourishment: But this would bee done, sitting upright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the Stomach.

58 The Fourth *Meanes* is to provide that the Parts themselves may draw to them the Nourishment strongly. There is an Excellent Observation of *Aristotle*; That a great reason, why plants (some of them) are of greater Age, than *Living Creatures*, is, for that they yearely put forth new Leaves, and Boughes; whereas *Living Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nailes; which are Excrements, and no Parts. And it is most certaine, that whatsoever is young, doth draw Nourishment better, than that which is Old; And then (that which is the Mystery of that Observation) young *Boughes*, and *Leaves*, calling the Sap up to them; the same Nourisheth the *Body*, in the Passige. And this wee see notably proved also, in that the oft cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transferre therefore this Observatiou to the Helping

Helping of Nourishment in *Living Creatures*: The Noblest and Principall Use whereof is, for the *Prolongation* of *Life*; *Restauration* of some Degree of *Youth*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Living Creatures* Parts that Nourish, and Repaire easily; And Parts that Nourish and repaire hardly, And you must refresh, and renew those that are easie to Nourish, that the other may bee refreshed, and (as it were) Drinke in Nourishment, in the Passage. Now wee see that *Draught Oxen*, put into good Pasture, recover the Flesh of young Beefe; And Men after long Emaciating Diets, wax plumpe, and fat, and almost New: So that you may surely conclude, that the frequent and wise Use of those *Emaciating Diets*, and of *Purgings*; And perhaps of some kinde of *Bleeding*; is a principall Meanes of *Prolongation* of *Life*; and *Restoring* some Degree of *Youth*: For as wee have often said, *Death* commeth upon *Living Creatures* like the Torment of *Mezentius*.

Mortua quinetiam jungebat Corpora vivis,
Componens Manibus& Manus, at& Oribus Ora.

For the Parts in Mans Body easily reparable, (as *Spirits*, *Bloud* and *Flesh*) die in the Embracement of the Parts hardly reparable, (as *Bones*, *Nerves*, and *Membranes*;) And likewise some *Entrails* (which they reckon amongst the *Spermaticall Parts*) are hard to repaire: Though that Division of *Spermaticall*, and *Menstruall Parts*, be but a Conceit. And this same *Observation* also may bee drawne to the present purpose of Nourishing Emaciated Bodies: And therefore *Gentle Frication* draweth forth the Nourishment, by making the Parts a little hungry, and heating them; wherby they call forth Nourishment the better. This *Frication* I wish to be done in the Morning. It is also best done by the *Hand* or peece of *Scarlet woull*, wet a little with *Oile* of *Almonds*, mingled with a small Quantity of *Bay-Salt*, or *Saffron*; We see that the very Currying of Horses doth make them fat, and in good liking.

59 The fifth *Meanes* is, to further the very *Act*, of *Assimilation* of *Nourishment*; which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I have compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The use of it would bee betweene Sleepes; For in the latter Sleepe the Parts Assimilate chiefly.

Experiment Solitary touching *Vnum Medicinale*. 60

THere be many *Medicines*, which by themselves would doe no Cure, but perhaps Hurt; but being applyed in a certaine Order, one after another, doe great Cures. I have tried (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driven it away in 24. Houres space: It is first to apply a *Pultasse*; Of which *vide* the *Receit*; And then a *Bath* or *Fomentation* of which *vide* the *Receit*; And then a *Plaister*, *vide* the *Receit*. The *Pultasse* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pultasse*, Draweth gently; And therfore draweth the Humours out; and doth not draw more to it; For it

is a *Gentile Fomentation*, and hath withall a Mixture, (though very little) of some *Stupefactive*. The *Plaister* is a Moderate *Astringent Plaister*, which repelleth New Humour from falling. The *Pultasse* alone would make the Part more soft, and weake; And after to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultasse*, would draw forth little; If too strong, it would draw to the Part, as well as draw from it. The *Plaister* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pultasse* is to bee laid to, for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being used hot, and seven or eight times repeated: The *Plaister* to continue on still, till the Part be well confirmed.

Experiment Solitary touching *Cure by Custome*. 61

THere is a secret Way of *Cure*, (unpractized;) By *Assuetude* of that which in it selfe hurteth. *Poysons* have been made, by some, Familiar, as hath beene said. *Ordinary keepers* of the *Sicke* of the *Plague*, are seldome infected. *Enduring* of *Torturs*, by *Custome*, hath beene made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *wine* or *Strong Drinke*, hath beene, by *Custome*, made to bee without *Surfet*, or *Drunkennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kindes of *Palseyes*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Desease* be Incurable; Or whether the Just Cure of it bee not full of perill; And if hee finde it to bee such, let him resort to *Palliation*; And alleviate the *Symptome*, without busying himselfe to much with the perfect *Cure*: And many times, (if the *Patient* bee indeed patient,) that Course will exceed all Expectation. Likewise the *Patient* himselfe may strive, by little and little, to Overcome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment Solitary touching *Cure by Excesse*. 62

DIvers *Diseases*, especially *Chronicall*, (such as *Quartian Agues*;) are sometimes cured by *Surfet*, and *Excesses*: As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an Adventitious Strength from Custome, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leave them only to their first *Cause*; which if it be any thing weake will fall off. Besides, such *Excesses* doe Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment Solitary touching *Cure* by *Motion* of *Consent*. 63

THere is in the Body of Man a great *Consent* in the *Motion* of the severall Parts. We see, it is Childrens sport, to prove whether they can rub upon their Brieft with one hand, and pat upon their Fore-head with another; And straight-waies, they shall sometimes rubbe with both Hands, or pat with both hands. Wee see, that when the Spirits, that come to the Nosthrills, expell a bad Sent, the Stomach is ready to Expell

pell by Vomit. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they dye. So in *Pestilent Diseases*, if they cannot bee expelled by *Sweat* they fall likewise into *Looseesse*, and that is commonly Mortall. Therefore *Physitians* should ingeniously contrive, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Experiment Solitary touching *Cure* of *Diseases which are contrary to Predisposition*. 64

HIppocrates *Aphorisme*, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sexe*, *Season of the yeare*, *Diet*, &c. are more dangerous, than those that are Concurrent. A Man would thinke it should be otherwise; For that, when the *Accident of Sickneesse*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should bee more forcible: And so (no doubt) it is; if you suppose like *Quantitie* of *Matter*. But that, which maketh good the *Aphorisme*, is, Because such *Diseases* doe shew a greater *Collection of Matter*, by that they are able to overcome those *Naturall Inclinations* to the Contrary. And therefore in *Diseases* of that kinde, let the *Physition* apply himselfe more to *Purgation*, than to *Alteration*; Because the Offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Experiment Solitary touching *Preparations* before *Purging*, and *setling* of the *Body* afterward. 65

PHysitians do wisely prescribe, that there be *Preparatives* used before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body bee not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not comming faire away; Which causeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently, Therefore the worke of *Preparation* is double; To make the *Humours fluide*, and mature; And to make the *Passages* more open: For both those helpe to make the Humours passe readily. And for the former of these, *Sirrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broaths*; *Clisters* also helpe lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies abounding* with *Humours*; And *fat Bodies*; And *Open Weather*; are *Preparatives* in themselves; because they make the Humours more fluide. But let a *Physitian* beware, how he purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the *Lodging* of some *Humours* in *ill Places*: For it is certaine, that there be *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places, (especially Passages,) doe much mischiefe. Therefore it is good, after *Purging*, to use *Apozumes*, and *Broths*, not so much *Opening* as those used before *Purging*, but *Abstersive* and

Mundifying Cliſters alſo are good to conclude with, to draw away the Reliques of the Humors, that may have deſcended to the *Lower Region* of the *Body*.

Experiment Solitary touching *Stanching of Bloud*. 66

Bloud is ſtanched divers wayes. Frſt by *Aſtringents*, and *Repercuſſive Medicines*. Secondly by *Drawing* of the *Spirits* and *Bloud inwards*; which is done by *Cold*; As *Iron* or a *Stone* laid to the neck doth ſtanch the Bleeding at the Noſe; Alſo it hath beene tryed, that the *Teſticles*, being put into ſharp Vineger, hath made a ſuddaine Receſſe of the Spirits, and ſtanched Bloud. Thirdly by the *Receſſe of the Bloud by Sympathy*. So it hath beene tried, that the part that bleedeth, being thruſt into the Body of a Capon, or Sheepe, new ript and bleeding, hath ſtanched *Bloud*; The *Bloud*, as it ſeemeth, ſucking and drawing up, by ſimilitude of ſubſtance, the *Bloud* it meeteth with, and ſo it ſelfe going backe. Fourthly by Cuſtome and Time; So the Prince of *Aurange*, in his firſt hurt, by the *Spaniſh Boy*, could finde no meanes to ſtanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to have the *Oriſice* of the *wound* ſtopped by *Mens Thumbes*, ſucceeding one another, for the ſpace at the leaſt of two Dayes; And at the laſt the bloud by *Cuſtome* onely retired. There is a fifth Way alſo in uſe, to let *Bloud* in an *Adverſe Part*, for a *Revulſion*.

Experiment Solitary touching *Change* of *Aliments* and *Medicines*. 67

IT helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the ſame *Medicine* & *Aliment* ſtill. The Cauſe is, for that *Nature* by continuall Uſe of any Thing, groweth to a *Sacietie*, and *Dulneſſe*, either of *Appetite*, or *working*. And we ſee that *Aſſuetude* of *Things Hurtfull* doth make them leeſe their force to Hurt; As *Poyſon*, which with uſe ſome have brought themſelves to brooke. And therefore it is no marvaile, though *Things helpfull* by *Cuſtome*, leeſe their force to Helpe, I count *Intermiſſion* almoſt the ſame thing with *Change*; For that, that hath beene intermitted, is after a ſort new.

Experiment Solitary touching *Diets*. 68

IT is found by Experience, that in *Diets of Guaiacum*, *Sarza*, and the like (eſpecially if they be ſtrict,) the *Patient* is more troubled in the beginning, than after continuance; Which hath made ſome of the more delicate Sort of patients, give them over in the middeſt; Suppoſing that if thoſe Diets trouble them ſo much at firſt, they ſhall not be able to endure them to the End. But the Cauſe is, for that all thoſe *Diets*, doe drie up *Humours*, *Rheumes*, and the like; And they cannot Drie up untill they have firſt attenuated; And while the *Humour* is attenuated, it is more Fluid, then is was before, and troubleth the Body a great deale more, untill it be dried up, and conſumed. And therefore *Patients* muſt expect a due time, and not check at them at the firſt.

Experiments in Conſort touching the *Production* of *Cold*.

THe *Producing* of *Cold* is a thing very worthy the Inquiſition; both for Uſe, & Diſcloſure of Cauſes. For *Heat* and *Cold*

Cold are *Natures* two hands, whereby ſhee chiefly worketh: And *Heat* we have in readineſſe, in reſpect of the *Fire*; But for *Cold* wee muſt ſtaie till it commeth; or ſeeke it in deepe Caves, or high Mountaines: And when all is done, we cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farr hotter, than a *Summers Sunne*; But *Vaults*, or *Hills* are not much Colder than a *Winters Froſt*.

69 The firſt *Meanes* of *Producing Cold*, is that which *Nature* preſenteth us withall; Namely the *Expiring* of *cold* out of the *Inward Parts of the Earth* in *Winter*, when the Sun hath no power to overcome it; the *Earth* being (as hath beene noted by ſome) *Primum Frigidum*. This hath beene aſſerted, as well by Ancient as by Moderne *Philoſophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the diſcourſe in *Plutarch* (for I take it that booke was not *Plutarches* owne) *De primo Frigido*. It was the opinion of *Teleſius*, who hath renewed the *Philoſophy* of *Parmenides*, and is the beſt of the *Novelliſts*.

70 The ſecond *Cauſe* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is Active and Tranſitive into Bodies Adjacent, as well as *Heat*: which is ſeene in thoſe things that are touched with *Snow* or *Cold water*. And therefore, whoſoever will be an *Inquirer* into *Nature*, let him reſort to a *Conſervatory* of *Snow* and *Ice*; Such as they *uſe for delicacy*, to coole Wine in Summer: Which is a Poore and Contemptible uſe, in reſpect of other uſes, that may bee made of ſuch *Conſervatories*.

71 The Third *Cauſe* is the *Primary Nature* of all *Tangible bodies*: For it is well to be noted, that all Things whatſoever (*Tangible*) are of themſelves *Cold*; Except they have an Acceſſory *Heat* by *fire*; *Life*; or *Motion*: For even the *Spirit* of *Wine*, or *Chymicall Oyles*, which are ſo hot in Operation, are to the firſt Touch, *Cold*; And *Aire* it ſelfe compreſſed, & Condenſed a little by blowing, is *Cold*.

72 The Fourth *Cauſe* is the *Denſity of the Body*; For all *Denſe Bodies* are *Colder* than moſt other *Bodies*; As *Mettals*, *Stone*, *Glaſſe*; And they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Denſe*, *Tangible*, hold all of the Nature of *Cold*. The Cauſe is, for that all *Matters Tangible* being *Cold* it muſt needs follow, that where the *Matter* is moſt Congregate, the *Cold* is the greater.

73 The Fifth *Cauſe* of *Cold*, or rather of increaſe and vehemence of *Cold*, is a *Quicke Spirit incloſed in a Cold Body*: As will appeare to any that ſhall attentively conſider of *Nature* in many Inſtances. Wee ſee *Nitre* (which hath a *Quicke Spirit*) is Cold; more *Cold* to the Tongue, than a Stone; So *Water* is *Colder* than *Oile*, becauſe it hath *a Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digeſted than *water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* than *water*, becauſe it hath *more Spirit* within it: So we ſee that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaſeth the *Activity* of *Cold*: So ſome *Inſecta* which have

Spirit

Spirit of *Life*, as *Snakes*, and *Silkwormes*, are to the touch, *Cold*. So *Quick-silver* is the *Coldest* of Mettales, because it is *fullest of Spirit*.

74 The Sixth *Cause* of *Cold* is *the Chasing and Driving away of Spirits*, such as have some *Degree of Heat*: For the Banishing of the *Heat* must needs leave any Body *Cold*. This wee see in the Operation of *Opium*, and *Stupefactives*, upon the Spirits of living Creatures: And it were not amisse to trie *Opium*, by laying it upon the Top of a *Weather-glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a Body as Glasse, I conceive that *Opium*, and the like, make the *Spirits* fly rather by *Malignity*, than by *Cold*.

75 Seventhly, the same *Effect* must follow upon the *Exhaling or Drawing out of the warme Spirits*, that doth upon the Flight of the Spirits. There is an Opinion, that the *Moone* is Magneticall of *Heat*, as the *Sun* is of *Cold* and *Moisture*: It were not amisse therefore to trie it, with *warme-waters*; The one exposed to the Beames of the *Moone*; the other with some Skreene betwixt the Beames of the *Moone* and the *water*; As we use to the *Sunne* for Shade; And to see whether the former will coole sooner. And it were also good to inquire, what other Meanes there may be, to draw forth the *Exile heat*, which is in the *Aire*; for that may bee a Secret of great Power to Produce *Cold weather*.

Experiments in Consort touching the *Version* and *Transmutation of Aire into water*.

WEe have formerly set downe the *Meanes of turning Aire into water*, in the *Experiment* 27. But because it is *Magnale Naturæ*; And tendeth to the subduing of a very great effect; And is also of Manifold use; we will adde some *Instances* in *Consort* that give light thereunto.

76 It is reported by some of the *Ancients*, that *Sailers* have used, every Night, to hang *Fleeces of woll* on the sides of their *Ships*, the *woll* towards the water; And that they have crushed fresh Water out of them, in the Morning, for their use. And thus much wee have tried, that a *Quantitie* of *woll* tied loose together being let downe into a deepe *well*; And hanging in the *Middle*, some three Fathome from the water, for a night, in the Winter time; increased in weight, (as I now remember) to a fifth Part.

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78 It is reported of very good credit, that in the *East-Indies*, if you set a Tub of *water* open in a Roome where *Cloves* are kept, it will be drawne dry in 24. houres; Though it stand at some distance from the *Cloves*. In the Countrey, they use many times, in deceit, when their *woll* is new shorne, to set some Pailes of *water* by, in the same Roome; to increase the weight of the *woll*. But it may bee, that the Heat of the *woll*, remaining from the body of the Sheepe; or the Heat gathered by the lying close of the *woll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*.

79 It is Reported also credibly, that *woll* new shorne, being laid casually upon a *Vessell* of *Verjuyce*, after some time, had drunke up a great part of the *Verjuyce*, though the Vessell were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (upon the by) to be noted, the *Percolation*, or *Suing* of the *Verjuyce* through the wood; For *Verjuyce* of it selfe would never have passed thorow the wood: So as, it seemeth, it must bee first in a kinde of Vapour, before it passe.

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Marbles, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the Body yeeldeth; Or else by the Moist Aire thickned against the hard body. But it is plaine, that it is the latter; For that wee see *wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *wood* alone: which is caused by the Smoothnesse and Closeneſſe; which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. We see also, that *Breathing* upon a *Glasse*, or Smooth body, giveth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew upon the

the Inside of Glasse-windowes; And the *Frost* it selfe upon the ground is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watry substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*.

82 It is very probable (as hath beene touched) that that, which will turne *Water* into *Ice*, will likewise turne *Aire* Some Degree nearer unto *water*. Therefore trie the *Experiment* of the *Artificiall Turning water into Ice* (whereof we shall speake in another place) with *Aire* in place of *water*, and the *Ice* about it. And although it bee a greater Alteration to turne *Aire* into *water*, than *water* into *Ice*: yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that Artificiall *Conversion* of *water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments in Consort touching *Induration of Bodies.*

INduration, or *Lapidification*, of Substances more soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Alccelerating thereof is very worthy to bee inquired. It is effected by three Meanes. The first is by *Cold*; whose Property is to *Condense*, and constipate, as hath beene said. The Second is by *Heat*; which is not proper but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And upon that, the more grosse of the Tangible Parts doe contract and serre themselves together; Both to Avoid *Vacuum* (as they call it;) And also to Munite themselves against the Force of the *Fire*, which they have suffered. And the Third is by *Assimilation*; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay: And so of *Mineralls*, which come (no doubt) at first, of Juyces Concrete, which afterward indurate: And so of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And so the Making of *Bricke*, and *Tile*: Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, & *Coystall*, which harden

den with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, & *Spiders*, which are found in it; And many more: But we will speake of them distinctly.

For *Indurations* by *Cold*, there bee few Trialls of it; For wee have no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the Sunne, and the Heavens. The likelieſt Triall is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* activated by *Nitre*, or *Salt*, will turne *water* into *Ice*, and that in a few houres; So it may be, it will turne *wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conserving Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Niter*,) a Peece of *Wood*, or a Peece of *Tough Clay*, and let it lye a Moneth, or more. 83

Another Triall is by *Metalline-waters*, which have virtuall *Cold* in them. Put therefore *wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And try whether it will not harden in some reasonable time. But I understand it, of *Metalline waters*, that come by Washing, or Quenching; And not of *Strong waters* that come by dissolution; for they are too Corrosive to consolidate. 84

It is already found, that there are some *Naturall Spring-waters*, that will Inlapidate *Wood*; So as you shall see one peece of *Wood*, whereof the Part above the *Water* shall continue *Wood*; And the Part under the *Water* shall be turned into a kinde of *Gravelly Stone*. It is likely those *Waters* are of some *Metalline Mixture*; But there would be more particular Inquiry made of them. It is certaine, that an *Egge* was found, having lien many yeeres in the bottome of a Moate, where the Earth had somewhat overgrowen it; And this Egge was comen to the Hardnesse of a *Stone*; And had the Colours of the white and yolke perfect: And the Shell shining in small graines like Sugar, or Alablaster. 85

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Mettalls*, themselves are hardened by often *Heating* and *quenching* in *Cold water*: For *Cold* ever worketh most potently upon *Heat* precedent. 86

For *Induration* by *Heat*, it must be considered, that *Heat*, by the Exhaling of the Moister Parts, doth either harden the Body; As in *Bricks*, *Tiles*, &c; Or if the *Heat* be more fierce, maketh the grosser part it selfe, Runne and Melt; As in the making of ordinary *Glasse*; And in the *Vitrification* of *Earth*, (As we see in the Inner Parts of *Furnaces*;) And in the *Vitrification* of *Brick*; And of *Mettalls*. And in the former of these, which is the Hardening by baking, without Melting, the *Heat* hath these degrees; First it *Indurateth*; and then maketh *Fragile*; And lastly it doth *Incinerate* and *Calcinate*. 87

But if you desire to make an *Induration* with *Toughnesse*, and lesse Fragility; A middle way would be taken; Which is that which *Aristotle* hath wel noted, But would be throughly verified. It is, to decoct *Bodies* in *water*, 88

water, for two or three dayes; But they must bee such Bodies, into which the *water* will not enter; As *Stone*, and *Metall*. For if they be Bodies into which the *water* will enter, then long Seething, will rather Soften than indurate them; As hath been tried in *Eggs* &c. Therefore, Softer *Bodies* must bee put into Bottles; And the Bottles hung into Water seething, with the mouths open, above the *Water*; that no *water* may get in; For by this Meanes, the virtuall *Heat* of the *water* will enter; And such a *Heat*, as will not make the Body adust, or fragile; But the Substance of the *water* will bee shut out. This *Experiment* wee made; And it sorted thus. It was tried with a peece of *Free-Stone*, and with *Pewter*, put into the *Water* at large. The *Free-Stone* we found received in some *water*; For it was softer, and easier to scrape, than a peece of the same *Stone* kept drie. But the *Pewter* into which no *water* could enter, became more white, and liker to Silver, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, & a Peece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone*; The *Cheese* likewise very hard, and not well to be cut: The *Chalke* and the *Free-Stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to white, as in ordinary Drying by the Sunne. Note, that all the former Trials were made by a Boyling upon a good hot Fire, renewing the *water* as it consumed, with other hot *water*; But the Boyling was but for twelve houres only; And it is like that the Experiment would have beene more effectuall, if the Boyling had beene for two or three daies, as we prescribed before.

89 As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) wee see Examples of it in some *Stones* in *Clay-Grounds*, lying near to the top of the Earth, where *Pebble* is; In which you may manifestly see divers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themselves: And it were good to make a Triall of purpose, by taking *Clay*, and putting in it divers *Pebble-Stones*, thicke set, to see whether in continuance of time, it will not be harder than other *Clay* of the same lumpe, in which no *Pebbles* are set. Wee see also in Ruines of old Walls, especially towards the Bottome, the *Morter* will become as hard as the *Bricke*; we see also, that the *wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the *wood* it selfe; And Scales likewise grow to the *Teeth*, harder than the *Teeth* themselves.

90 Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures*: For no Nourishment that the *Tree* receiveth, or that the *living Creature* receiveth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment Solitary touching the *Version of water into Aire*. 91

THe Eye of the understanding, is like the Eye of the Sense: For as you may see great Objects through smal Cranies, or Levels: So you may

may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* upon *watry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh up suddenly. But the like *Cloud*, if it were *Oyly*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth upon *water*; And *Flame*, and *Fire*, upon *Oyle*; And therefore, to take out a Spot of Grease, they use a *Coale* upon browne Paper; because *Fire* worketh upon Grease, or *Oyle*, as *Aire* doth upon *Water*. And we see *Paper oyled*, or *Wood oyled*, or the like, last long moist; but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* meddleth little with the *Moisture* of *Oyle*.

Experiment Solitary touching the *Force of Vnion*. 92

THere is an Admirable demonstration, in the same trifling *Instance* of the *little Cloud* upon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force of Vnion*, even in the least Quantities, and weakest Bodies, how much it conduceth to Preservation of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*; And you shall see it ever breake up, first in the Skirts, and last in the middest. We see likewise, that much *Water* draweth forth the Juyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation upon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiveth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Active Body, that should subdue it.

Experiment Solitary touching the *Producing of Feathers and Haires of divers Colours*. 93

WE have spoken before in the fifth *Instance*, of the Cause of *Orient Colours in Birds*; which is by the Fineness of the Strainer; we will now endevour to reduce the same *Axiome* to a *Worke*. For this Writing of our *Sylva Sylvarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Natural Magicke*. For it is not a Description onely of Nature, but a Breaking of Nature, into great and strange Workes. Trie therefore, the Anointing over of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelps*, cutting their Haire as short as may be; Or of some other Beast; with some oyntment, that is not huntfull to the Flesh; And that will harden, and sticke very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is received, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *White* is a penurious Colour, and where Moisture is scant. So *Blew Violets*, and other *Flowers*, if they be starved, turne Pale and *white*; *Birds*, and *Horses*, by Age, or Scarres, turne *white*: And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that come

come first, will be many times of divers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the Feathers will come *white*. This is a good *Experiment*, not onely for the Producing of *Birds* and *Beasts* of strange Colours; but also, for the Disclosure of the Nature of *Colours* themselves; which of them require a finer Porositie, and which a grosser.

Experiment Solitary touching *the Nourishment of Living Creatures before they bee brought forth.* 94

IT is a worke of Providence, that hath beene truly observed by some; That the *Yolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *Yolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe; have in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and severed from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; But onely a quickening *Heat* when shee sitteth. But Beasts, and Men need not the matter of Nourishment within themselves; Because they are shaped within the Wombe of the Female, and are Nourished continually from her Body.

Experiments in Consort touching *Sympathy and Antipathy for Medicinall use.* 95

IT is an Inveterate and received Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Received, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to move Gravell, and to dissolve the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe Gravell, as Men have beene glad to remove it; It was so violent.

96 It is received and confirmed by daily Experience, that the *Soales* of the *Feet* have great Affinitie with the *Head*, and the *Mouth* of the *Stomach*: As we see, *Going wet-shod*, to those that use it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after drie the *Rheume*: And therefore a *Physitian*, that would be Mysticall, prescribeth, for the Cure of the *Rheume*, that a Man should walke Continually upon a *Camomill Alley*; Meaning, that he should put *Camomill* within his Sockes. Likewise *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applyed unto them, provoke *Sleepe*.

97 It seemeth, that as the *Feet* have a Sympathy with the *Head*; So the *Wrests* and *Hands*, have a Sympathy with the *Heart*; We see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tried, that Juyces of *Stock-Gilly-Flowers*, *Rose-Campian*, *Carlicke*, and other things; applyed to the *Wrests*, and renewed; have cured long *Agues*. And I conceive, that washing with certaine *Liquours*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the Hands, *Egges of Alablaster*, and *Balls* of *Crystall*.

Of these things wee shall speake more, when wee handle the Title *of* Sympathy *and* Antipathy, *in the proper Place.* The

Experiment Solitary touching the *Secret Processes of Nature.* 98

THe Knowledge of man (hitherto) hath beene determined by the View, or Sight; So that whatsoever is Invisible, either in respect of the *Fineness of the Body* it selfe; Or the *Smallness of the Parts*; Or of the *Subtilsie of the Motion*; is little inquired. And yet these be the Things that Governe Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumaticals*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will have them to be *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will have them to be the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselves. And then, when they come to Plants and living Creatures, they call them *Soules*. And such Superficiall Speculations they have; Like Prospectives, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in *Nature*. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse: And they are never (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vivification*, and most of the Effects of *Nature*: For, as we have figured them in our *Sapientiâ Veterum*, in the *Fable* of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupide things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath given some light, in discerning by their Separations, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of *Bodies*, and the like. And the *Physitians* are content to acknowledge, that *Herbs* and *Drugs* have divers Parts; As that *Opium* hath a Stupefactive Part, and a Heating Part; The one moving Sleepe, the other a Sweat following; And that *Rubarb* hath Purging Parts, and Astringent Parts, &c. But this whole *Inquisition* is weakly and negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts of Bodies*, which doe so great Effects, they have not beene observed at all; because they are Invisible, and incurre not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientiæ esse convincitur*; *Atomum enim nemo unquam vidit*. And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all

Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and ſhall be throughly handled in due place,) is not ſeene at all. But nevertheleſſe, if you know it not, or enquire it not attentively and diligently, you ſhall never be able to diſcerne, and much leſſe to produce, a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Encloſures of Bodies, whereby the effects (which were mentioned before) paſſe between the *Spirits*, and the *Tangible Parts*; (which are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Paſſions*, and ſuch other *Logicall* Words.

Experiment Solitary touching the *Power of Heat*. 99

IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewiſe, that the Effects of *Heat*, are moſt advanced, when it worketh upon a Body, without loſſe or diſſipation of the Matter; for that ever betrayeth the Account. And therefore it is true, that the power of *Heat* is beſt perceived in *Diſtillations*, which are performed in cloſe Veſſels, and Receptacles. But yet there is a higher Degree; For howſoever *Diſtillations* doe keepe the Body in Cells, and Cloyſters, without Going abroad, yet they give ſpace unto Bodies to turne into Vapour; To returne into Liquour; And to Separate one part from another. So as *Nature* doth Expatiate, although it hath not full Libertie: whereby the true and Ultime Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no ſuch Reciprocation of *Rarefaction*, and of *Condenſation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeves, will turne and change into many *Metamorphoſes*. Take therefore a *Square veſſell* of *Iron*, in forme of a Cube, and let it have good thicke and ſtrong Sides. Put into it a Cube of *Wood*, that may fill it as cloſe as may be; And let it have a Cover of Iron, as ſtrong (at leaſt) as the Sides; And let it be well Luted, after the manner of the *Chymiſts*. Then place the *Veſſell* within burning *Coales*, kept quicke kindled, for ſome few houres ſpace. Then take the *Veſſell* from the *Fire*, and take off the Cover, and ſee what is become of the *Wood*. I conceive that ſince all *Inflammation*, and *Evaporation* are utterly prohibited, and the *Body* ſtill turned upon it Selfe, that one of theſe two Effects will follow: Either that the *Body* of the *Wood* will be turned into a kinde of *Amalagma*, (as the *Chymiſts* call it;) Or that the Finer Part will be turned into *Aire*, and the Groſſer ſticke as it were baked, and incruſtate upon the Sides of the *Veſſell*; being become of a Denſer Matter, than the *wood* it ſelfe, Crude. And for another Triall, take alſo *water*, and put it in the like Veſſell, ſtopped as before; But uſe a gentler *Heat*, and remove the Veſſell ſometimes from the Fire; And againe, after ſome ſmall time, when it is Cold, renue the *Heating* of it: And repeat this *Alteration* ſome few times: And if you can once bring to paſſe, that the *water*, which is one of the Simpleſt of Bodies, be changed in Colour, Odour, or Taſte, after

after the manner of Compound Bodies, you may be ſure that there is a great Worke wrought in Nature, and a Notable Entrance made into ſtrange Changes of Bodies, and productions: And alſo a Way made, to doe that by Fire, in ſmall time, which the Sunne and Age doe in long time. But of the Admirable Effects of this *Diſtillation in Cloſe*, (for ſo we call it) which is like the *wombes* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; Wee will ſpeake fully, in the due place; Not that we Aime at the making of *Paracelſus Pigmey's*; Or any ſuch Prodigious Follies; But that we know the Effects of *Heat* will be ſuch, as will ſcarce fall under the Conceit of Man; If the force of it be altogether kept in.

Experiment Solitary, touching the *Impoſſibilitie* of *Annihilation*. 100

THere is nothing more Certaine in Nature, than that it is impoſſible for any *Body*, to be utterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well ſaid, by an Obſcure Writer of the *Sect* of the *Chymiſts*; That there is no ſuch way to effect the Strange *Tranſmutations* of *Bodies*, as to endevour and urge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained alſo a great Secret of Preſervation of Bodies from Change; For if you can prohibit, that they neither turne into *Aire*, becauſe no *Aire* commeth to them; Nor goe into the *Bodies Adjacent*, becauſe they are utterly Heterogeneall; Nor make a *Round* and *Circulation* within themſelves; they will never change, though they be in their Nature never ſo Periſhable, or Mutable. Wee ſee, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceive the like will be of *Bodies* put into *Quick-ſilver*. But then they muſt be but thinne; As a leafe, or a peece of Paper, or Parchment; For if they have a greater Craſſitude, they will alter in their owne Body, though they ſpend not. But of this, We ſhall ſpeake more, when wee handle the *Title* of *Conſervation* of *Bodies*.

NATVRALL HISTORIE.

II. Century.

MVSICKE in the *Practice*, hath beene well pursued; And in good Variety; But in the *Theory*, and especially in the *Yeelding* of the *Causes* of the *Practique*, very weakly; being reduced into certaine Mysticall Subtilties, of no use, and not much Truth. Wee shall therefore, after our manner, joyne the *Contemplative* and *Active Part* together.

Experiments in Consort touching *Musicke*.

101 All *Sounds*, are either *Musicall Sounds*, which we call *Tones*; Whereunto there may be an *Harmony*; which *Sounds* are ever *Equall*; As *Singing*, the *Sounds of Stringed*, and *Wind-Instruments*, the *Ringing of Bells*, &c. Or *Immusicall Sounds*; which are ever *Vnequall*; Such as are the *Voyce in Speaking*, all *whisterings*; all *Voices of Beasts*, *and Birds*, (except they bee *Singing Birds*;) all *Percussions*, of *Stones*, *wood*, *Parchment*, *Skins* (as in *Drummes*;) and infinite others.

102 The *Sounds* that produce *Tones*, are ever from such *Bodies*, as are in their Parts and Pores *Equall*; As well as the *Sounds* themselves are *Equall*; And such are the *Percussions* of *Metall*, as in *Bells*, Of *Glasse*, as in the Fillipping of a *Drinking Glasse*; Of *Aire*, as in *Mens voices whilest they Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*, as in the *Nightingale-Pipes* of *Regalls*, or *Organs*, and other *Hydraulickes*; which

which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man thinke, that the *String* of the *Bowe*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created between the *Bowe* or *Plectrum*, and the *String*; But between the *String* and the *Aire*; No more than it is between the *Finger* or *Quill*, & the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that create *Tones*; *Percussions* of *Metalls*, (comprehending *Glasse*, and the like;) *Percussions* of *Aire*; and *Percussitions* of *Water*.

103 The *Diapason* or *Eight* in *Musicke* is the sweetest *Concord*; Insomuch, as it is in effect an *Vnison*; As wee see in *Lutes*; that are strung in the Base *Strings* with two strings, one an *Eight* above another; Which make but as one *Sound*. And every *Eight Note* in Ascent, (as from *Eight* to *Fifteene* from *Fifteene* to *twenty two*, and so *in infinitum*,) are but *Scales of Diapason*. The *Cause* is darke, and hath not beene rendred by any; And therefore would be better contemplated. It seemeth that Aire, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath been said) admitteth much Varietie; As wee see in the *Voices* of *Living Creatures*; And likewise in the *Voices* of severall *Men*; (for we are capable to discerne severall *Men* by their *Voices*;) And in the *Coniugation of Letters*, whence *Articulate Sounds* proceed; Which of all others are most various. But in the Sounds which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it selfe into any such varietie; But is forced to recurre into one and the same Posture or Figure, only differing in Greatnesse and Smalnesse. So we see *Figures* may be made of lines, Crooked and Straight, in infinite Varietie, where there is Inequalitie; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of Equall lines) can differ but in Greater, or Lesser.

104 It is to be noted (the rather lest any Man should thinke, that there is any thing in this *Number* of *Eight*, to create the *Diapason*), that this Computation of *Eight*, is a thing rather receiued, than any true Computation. For a true Computation ought euer to bee, by Distribution into equall Portions. Now there be intervenient in the *Rise* of *Eight* (in *Tones*) two *Beemolls*, or *Half-notes*; So as if you diuide the *Tones* equally, the *Eight* is but *Seuen* whole and equall *Notes*; And if you subdiuide that into *Halfe Notes*, (as it is in the Stops of a *Lute*), it maketh the *Number* of *thirteene*,

105 Yet this is true; That in the ordinarie Rises and Falls of the *Voice* of *Man*, (not measuring the *Tone* by whole Notes, and halfe Notes, which is the Equall Measure;) there fall out to be two Beemols (as hath beene said) betweene the *Vnison* and the *Diapason*: And this Varying is naturall. For if a Man would endeuour to raise or fall his *Voice*, still by *Half-Notes*, like the Stops of a *Lute*; or by whole *Notes* alone, without *Halfes*; as farre as an *Eight*; he will not be able to frame his *Voice* unto it. Which sheweth, that after every three whole *Notes* Nature requireth, for all Harmonicall use, one *halfe Note* to be intreposed.

106 It is to be considered, that whatsoever Vertue is in *Numbers*, for Conducing

Conducing to Concent of *Notes*, is rather to bee ascribed to the *Antecedent Number*, than to the *Eentire Number*; As namely, that the Sound returneth after *Six*, or after *Twelue*; So that the *Seventh*, or the *Thirteenth* is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seventh* and the *Thirteenth* are but the limits and Bounda ies of the *returne*.

The *Concords* in *Musick* which are *Perfect*, or *Semiperfect*, betweene 107
the *Vnison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect*; the *Third* next; And the *Sixth* which is more harsh: And as the Ancients esteemed, and so do my selfe and some Other yet, the *Fourth* which they call *Diatessaron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so *in Infinitum*; they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eight* respectively from them.

For *Discords*, the *Second*, and the *Seventh*, are of all others the most 108
odious, in *Harmony*, to the *Sense*; wherof the One is next above the *Vnison*, the Other next under the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*.

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturbe 109
the *Harmony*, though there bee a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are Odious; And therfore the ordinary *Concent* of *Foure Parts* consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cause* is, for that the *Base* striking more Aire, doth overcome and drowne the *Treble*, (unlesse the *Discord* bee very Odious;) And so hideth a small Imperfection. For wee see, that in one of the *lower Strings* of a *Lute*, there soundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the *Sound* of the *Base*: 110

Wee have no *Musick* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For wee see the *Halfe-Notes* themselves doe but interpose sometimes. Nevertheless wee have some *Slides* or *Relishes*, of the Voice, or Strings, as it were continued without *Notes*, from one *Tone* to another, rising or falling, which are delightfull. 111

The Causes of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receive light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There bee two Things Pleasing to the Sight, (leaving *Pictures*, and *Shapes* aside, which are but Secondary Objects; And please or displease but in Memoty;) these two are, *Colours*, and *Order*. The pleasing of *Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*; But the Pleasing of *Order* doth symbolize with *Harmony*. And therefore wee see in *Garden-knots*, and the *Frets of Houses*, and all equall and well-answering *Figures*, (as *Globes*, *Pyromides*, *Cones*, *Cylenders*, &c.) how they please; whereas *unequall Figures* are but Deformities. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*, *Good Proportion*, or *Correspondence*: So that (out of Question,) *Equality*, and *Correspondence*, are the *Causes* of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding we shall speake somewhat, (when wee handle *Tones*,) in the generall Enquiry of

Sounds. *Tones*

112 Tones are not so apt altogether to procure *Sleepe*, as some other *Sounds*; As the *Wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cause* whereof is, for that *Tones*, because they are Equall, and slide not, doe more strike and erect the Sense, than the other. And Overmuch Attention hindreth *Sleepe*.

113 There be in *Musick* certaine *Figures*, or *Tropes*; almost agreeing with the *Figures* of *Rhetoricke*; And with the *Affections* of the *Minde*, and other *Senses*. First, the *Division* and *Quavering*, which please so much in *Musick*, have an Agreement with the *Glittering* of *Light*; As the *Moone-Beames* playing upon a Wave. Againe, the *Falling* from a *Discord* to a *Concord*, which maketh great Sweetnesse in *Musick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after some dislikes: It agreeth also with the *Taste*, which is soone glutted with that which is sweet alone. The *Sliding from the Close or Cadence*, hath an Agreement with the *Figure* in *Rhetoricke*, which they call *Praeter Expectatum*. For their is a Pleasure even in *Being deceived*. The *Reports*, and *Fuges*, have an Agreement with the *Figures* in *Rhetoricke*, of *Repetition*, and *Traduction*. The *Triplaes*, and *Changing of times*, have an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Measure Time*, are in the *Medley* of one *Dance*.

114 It hath beene anciently held, and observed, that the *Sense of Hearing*, and the *Kinds of Musick*, have most Operation upon *Manners*; As to encourage men, and make them Warlike; To make them Soft and Effeminate; To make them Grave; To make them Light; To make them Gentle and Inclined to Pitty, &c. The *Cause* is, for that the *Sense of Hearing* striketh the *Spirits* more immediately, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, have their Organs, not of so present and immediate Accesse to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediately upon the *Spirits*, and is forcible while the Object remaineth,) it is with a Communication of the Breath, or Vapour of the *Object Odorate*: But *Harmony* entring easily, and Mingling not at all, and Comming with a manifest Motion; doth by Custome of often Affecting the *Spirits*, and Putting them into one kinde of Posture, alter not a little the Nature of the *Spirits*, even when the Object is removed. And therefore wee see, that *Tunes* and *Aires*, even in their owne Nature, have in themselves some Affinity with the *Affections*; As there bee *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining mens mindes to Pitty*; *Warlike Tunes*; &c. So as it is no Marvell, if they alter the *Spirits*; considering that *Tunes* have a Predisposition to the *Motion* of the *Spirits* in themselves. But yet it hath beene noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of Passions, conforme unto them; yet generally, *Musick* feedeth that disposition of the *Spirits* which it findeth. Wee see also, that severall *Aires*, and *Tunes*, doe please severall *Nations*, and *Persons*, according to the Sympathy they have with their *Spirits*.

Perspective

Experiments in Consort touching Sounds; and first touching the Nullity, and Entity of Sounds.

Perspective hath been with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as far as concerneth *Musick*. But the *Nature of Sounds* in generall, hath beene superficially observed. It is one of the subtillest Peeces of Nature. And besides, I practise, as I doe advise; which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subject, which is Immateriate, or lesse Materiate; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heavens* turne about, in a most rapide Motion, without *Noise* to us perceived; Though in some *Dreames* they have been said to make an excellent *Musicke*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it bee thought, that it is the Greatnesse of distance from us, whereby the *Sound* cannot bee heard; Wee see that *Lightnings*, and *Coruscations*, which are neere at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Division of the *Aire*. The *Windes* in the *Upper Region* (which move the *Clouds* above (which wee call the *Racke*) and are not perceived below) passe without *Noise*. The *lower Windes* in a Plaine, except they be strong, make no *Noise*; But amongst Trees, the *Noise*, of such *windes* will be perceived. And the *windes* (generally) when they make a *Noise*, doe ever make it unequally, Rising and Falling, and sometimes (when they are vehement,) Trembling at the Height of their Blast, *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing through the *Aire*, till it fall upon the Ground, Water, Houses, or the like. *Water* in a *River* (though a swift Streame) is not heard in the Channell, but runneth in Silence, if it be of any depth; But the very *Streame* upon *Shallowes*, of Gravell, or Pebble, will bee heard. And *Waters*, when they beat upon the Shore, or are straitned, (as in the falls of Bridges;) Or are dashed against themselves, by *windes*, give a Roaring *Noise*. Any *peece of Timber*, or *Hard Body*, being thrust forwards by another Body Contiguous, without knocking, giveth no *Noise*. And so *Bodies* in weighing, one upon another, though the *upper Body* presse the *lower Body* downe, make no *Noise*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though unobserved;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced onley by the Breaking of the *Aire*; And not by the Impulsion of the Parts. So it is manifest; That where the Anteriour Body giveth way, as fast as the Posteriour commeth on, it maketh no *Noise*; bee the *Motion* never so great, or swift. 115

Aire open, and at *large*, maketh no *Noise*; except it bee sharply percussed; As in the *Sound* of a String, where *Aire* is percussed by a hard, 116

and

and stiffe Body; And with a sharp loose; For if the String be not strained, it maketh no *Noise*. But where the *Aire is pent*, and straitned, there Breath, or other Blowing, (which carry but a gentle Percussion,) suffice to create *Sound*; As in *Pipes*, and *winde-Instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the *Concave* of the *Pipe*, were it not for the *Fipple*, that straitneth the Aire, (much more than the *Simple Concave*;) would yeeld no *Sound*. For as for other *winde-Instruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters-hornes*, &c. Which appeareth by the blowne-cheeks of him that windeth them. *Organs* also are blowne with a strong winde, by the Bellowes. And note againe, that some kinde of *winde-Instruments*, are blowne at a small Hole in the side, which straitneth the Breath at the first Entrance; The rather, in respect of their *Traverse*, and *Stop* above the Hole, which performeth the *Fipples* Part; As it is seene in *Flutes*, and *Fifes*, which will not give *Sound*, by a Blast at the end, as *Recorders*, &c. doe. Likewise in all *Whistling*, you contract the Mouth; And to make it more sharp, Men sometimes use their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they give no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Casting; Which Hollownesse penneth the *Aire*: Nor yet *Arrowes*, except they bee ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small whistles*, or *Shepheards Oaten Pipes*; they give a *Sound*, because of their extreme Slendernesse, whereby the *Aire* is more pent, than in a Wider *Pipe*. Againe, the *Voices* of *Men*, and Living Creatures, passe through the throat, which penneth the Breath. As for the *Iewes Harp*, it is a sharp Percussion; And besides, hath the vantage of penning the *Aire* in the Mouth.

117 *Solide Bodies*, if they be *very softly percussed*, give no *Sound*; As when a man treadeth very softly upon *Boards*. So *Chests* or *Doores* in faire weather, when they open easily, give no *Sound*. And *Cart-wheeles* squeak not when they are liquoured.

118 The *Flame of Tapers*, or *Candles*, though it bee a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*. *Aire in Ovens*, though (no doubt) it doth (as it were) boyle, and dilate it selfe, and is repercussed; yet it is without *Noise*.

119 *Flame percussed by Aire*, giveth a *Noise*; As in Blowing of the Fire by Bellowes; Greater, than if the Bellowes should blow upon the *Aire* it selfe. And so likewise *Flame percussing the Aire strongly*, (as when Flame suddenly taketh and openeth,) giveth a *Noise*; So, Great *Flames*, whiles the one impelleth the other, give a bellowing *Sound*.

120 There is a Conceit runneth abroad, that there should bee a *white Powder*, which will discharge a Peece without *Noise*; which is a dangerous Experiment, if it should be true: For it may cause secret Murthers. But it seemeth to me unpossible; For, if the *Aire pent*, bee driven forth, and strike the *Aire open*, it will certainly make a *Noise*. As for the *white Powder* (if any such thing bee, that may extinguish, or dead the *Noise*,)

it

it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may be extinguished, or deaded, by discharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more divided *Sounds*: As if you should make a Crosse Barrell hollow, thorow the Barrell of a Peece, it may be, it would give severall Sounds, both at the Nose, and at the Sides. But I conceive, that if it were possible, to bring to passe, that there should be no *Aire* pent at the Mouth of the Peece, the Bullet might fly with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* upon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire*, that striketh upon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as tryall must be made by taking some small *Concave* of *Metall*, no more than you mean to fill with Powder; And laying the Bullet in the Mouth of it, halfe out into the *Open Aire*.

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to have killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning-Glasse*, when shee walked in *Saint Iames* Parke, from the Leads of the House. But thus much (no doubt) is true; That if *Burning Glasses* could be brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Navy*,) the *Percussion* of the *Aire* alone, by such a *Burning Glasse*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings*, without *Thunders*. 121

I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conveighed to the *Sense*; As well as the *Impression* of *Species visible*: Or else they will not be heard. And therefore, as the Bullet moveth so swift, that it is *Invisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*. For we see, that the Apprehension of the *Eye*, is quicker than that of the *Eare*. 122

All *Eruptions* of *Aire*, though small and slight, give an *Entity of Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-salt*, and *Bay-leaves*, cast into the Fire; So in *Chesnuts*, when they leape forth of the Ashes; So in *Greene Wood*, laid upon the Fire, especially *Roots*; So in *Candles*, that spit Flame, if they be wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose-leafe* gathered together into the fashion of a Purse, and broken upon the Fore-head, or Backe of the Hand, as Children use. 123

Experiments in Consort touching Production, Conservation, & Delation of Sounds; And

THe *Cause* given of *Sound*, that it should be an *Elision* of the *Aire*, (whereby, if they meane any thing, they meane a *Cutting*, or *Dividing*, or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit upon a few Instances; As the Manner is in the *Philosophy* Received. And it is common with Men, that if

F they

they have gotten a Pretty Expression, by a Word of Art, that Expression goeth currant, though it be empty of Matter. This Conceit of Elision, appeareth most manifestly to be false, in that the Sound of a Bell, String, or the like, continueth melting, some time, after the Percussion; But ceaseth straight-wayes, if the Bell, or String, be touched and stayed: whereas, if it were the Elision of the Aire, that made the Sound, it could not be, that the Touch of the Bell, or String, should extinguish so suddenly that Motion, caused by the Elision of the Aire. This appeareth yet more manifestly by Chiming with a Hammer, upon the Out-side of a Bell; For the Sound will be according to the inward Concave of the Bell; whereas the Elision, or Attenuation of the Aire, cannot be but onely betweene the Hammer, and the Out-side of the Bell. So againe, if it were an Elision, a broad Hammer, and a Bodkin, strucke upon Metall, would give a divers Tone; As well as a divers Loudnesse: But they doe not so; For though the Sound of the one be Louder, and of the other Softer, yet the Tone is the same. Besides, in Eccho's (whereof some are as loud as the Originall Voice) there is no new Elision; but a Repercussion onely. But that which convinceth it most of all, is; that Sounds are generated, where there is no Aire at all. But these and the like Conceits, when Men have cleared their understanding, by the light of Experience, will scatter, and breake up like a Mist.

the effect of the Art therein. 124

125 It is certaine, that Sound is not produced at the first, but with some Locall Motion of the Aire, or Flame, or some other Medium; Nor yet without some Resistance, either in the Aire, or the Body Percussed. For if there be a meere Yeelding, or Cession, it produceth no Sound; As hath beene said. And therein Sounds differ from Light, and Colours; which passe thorow the Aire, or other Bodies, without any Locall Motion of the Aire; either at the first, or after. But you must attentively distinguish, betweene the Locall Motion of the Aire, (which is but Vehiculum Causæ, A Carrier of the Sounds,) and the Sounds themselves, Conveighed in the Aire. For as to the former, we see manifestly, that no Sound is produced (no not by Aire it selfe against other Aire, as in Organs, &c.) but with a perceptible Blast of the Aire; And with some Resistance of the Aire strucken. For even all Speech, (which is one of the gentlest Motions of Aire,) is with Expulsion of a little Breath. And all Pipes have a Blast, as well as a Sound. We see also manifestly, that Sounds are carried with Wind: And therefore Sounds will be heard further with the Wind, than against the Wind; And likewise doe rise and fall with the Intension or Remission of the Wind. But for the Impression of the Sound, it is quite another Thing, and is utterly without any Locall Motion of the Aire, Perceptible; And in that resembleth the Species visible: For after a Man hath lured, or a Bell is rung, we cannot discerne any Perceptible Motion at all in the Aire, along as the Sound goeth; but onely at the first. Neither doth the Wind, (as farre as it carrieth a Voice) with the Motion thereof, confound any of the Delicate, and Articulate Figurations of the Aire, in Variety of Words. And if a Man speake a good loudnesse, against

the Flame of a Candle, it will not make it tremble much; though most, when those Letters are pronounced, which contract the Mouth; As F, S, V, and some others. But Gentle Breathing, or Blowing without speaking, will move the Candle farre more. And it is the more probable, that Sound is without any Locall Motion of the Aire, because as it differeth from the Sight, in that it needeth a Locall Motion of the Aire at first; So it paralleleth in so many other things with the Sight, and Radiation of Things visible; Which (without all question) induce no Locall Motion in the Aire, as hath beene said.

Neverthelesse it is true, that upon the Noise of Thunder, and great Ordnance, Glasse windowes will shake; and Fishes are thought to be frayed with the Motion, caused by Noise upon the water. But these Effects are from the Locall Motion of the Aire, which is a Concomitant of the Sound, (as hath beene said;) and not from the Sound. 126

It hath beene anciently reported, and is still received, that Extreme Applauses, and Shouting of People assembled in great Multitudes, have so rarified, and broken the Aire, that Birds flying over, have fallen downe, the Aire being not able to support them. And it is beleeved by some, that Great Ringing of Bells in populous Cities, hath chased away Thunder: and also dissipated Pestilent Aire: All which may be also from the Concussion of the Aire, and not from the Sound. 127

A very great Sound, neare hand, hath strucken many Deafe; And at the Instant they have found, as it were, the breaking of a Skin or Parchment in their Eare: And my Selfe standing neare one that Lured loud, and shrill, had suddenly an Offence, as if somewhat had broken, or beene dislocated in my Eare; And immediately after, a loud Ringing; (Not an ordinary Singing, or Hissing, but far louder, and differing;) so as I feared some Deafenesse. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred unto the Sound: For (as is commonly received) an over-potent Object doth destroy the Sense; And Spirituall Species, (both Visible, and Audible,) will worke upon the Sensories, though they move not any other Body. 128

In Delation of Sounds, the Enclosure of them preserveth them, and causeth them to be heard further. And wee finde in Rowles of Parchment, or Trunckes, the Mouth being laid to the one end of the Rowle of Parchment, or Truncke, and the Eare to the other, the Sound is heard much further, than in the Open Aire. The Cause is, for that the Sound spendeth, and is dissipated in the Open Aire; But in such Concaves it is conserved, and contracted. So also in a Peece of Ordnance, if you speake in the Touch-hole, and another lay his Eare to the Mouth of the Peece, the Sound passeth, and is farre better heard, than in the Open Aire. 129

It is further to be considered, how it proveth and worketh, when the Sound is not enclosed all the Length of his Way, but passeth partly through Open Aire; As where you speake some distance from a Truncke; or where the Eare is some distance from the Truncke, at the other end; Or where both Mouth and Eare are distant from the Truncke. And 130

It hath beene tried, that in a long *Trunke*, of some eight or ten foote, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Trunke*; And somewhat more holpen, when the *Eare* of the *Hearer* is neare, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from *abroad*, than *abroad* from within the *Chamber*.

131 As the *Enclosure*, that is *Round about and Entire*, preserveth the *Sound*; So doth a *Semi-Concave*, though in a lesse degree. And therefore, if you divide a *Truncke*, or a *Cane* into two, and one speake at the one end, and you lay your Eare at the other, it will carry the *Voice* further, than in the *Aire at large*. Nay further, if it be not a full *Semi-Concave*; but if you doe the like upon the *Mast of a Ship*, or a *long Pole*, or a *Peece of Ordnance*, (though one speake upon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, than in the Aire at large.

132 It would be tried, how, and with what proportion of disadvantage, the *Voice* will be carried in an *Horne*, which is a Line Arched; Or in a *Trumpet*, which is a Line Retorted; Or in some *Pipe* that were Sinuous.

133 It is certaine, (howsoever it crosse the Received Opinion,) that *Sounds* may be created without *Aire*, though *Aire* be the most favourable *Deferent* of *Sounds*. Take a *Vessell* of *Water*, and knap a paire of *Tongs* some depth within the Water, and you shall heare the *Sound* of the Tongs well, and not much diminished; And yet there is no *Aire* at all present.

134 Take one *Vessell* of *Silver*, and another of *Wood*; and fill each of them full of Water, and then knap the Tongs together, as before, about an handfull from the Bottome; and you shall finde the *Sound* much more Resounding from the *Vessell* of *Silver*, than from that of *Wood*: And yet if there be no Water in the *Vessell*, so that you knap the Tongs in the *Aire*, you shall finde no difference, betweene the *Silver* and *Wodden Vessell*. Whereby, beside the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communicateth with the Bottome of the *Vessell*: The other, that such a Communication passeth farre better, thorow *Water*, than *Aire*.

135 Strike any hard Bodies together, in the Middest of a *Flame*, and you shall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

136 The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath some Affinitie with the *Aire*, performeth, in some degree, the Parts of the *Aire*: As when you knocke upon an *Emptie Barrell*, the *Sound* is (in part) created by the Aire on the Outside; And (in part) by the *Aire* in the Inside: For the *Sound* will be greater, or lesser, as the Barrell is more Emptie, or more Full: But yet the *Sound* participateth also with the *Spirit* in the *Wood*, thorow which it passeth, from the Outside to the Inside: And so it commeth to passe, in the *Chiming* of *Bells*, on the Outside, where also the *Sound* passeth to the Inside. And a number of o-

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ther like Instances, whereof we shall speake more, when we handle the *Communication* of *Sounds*.

It were extreame Grossenesse to thinke, (as wee have partly touched before,) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula Motus*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first *Motion* of the *String*; but by the *Returne* or *Result* of the *String*, which was strained by the Touch, to his former Place: which *Motion* of *Result* is quicke and sharpe; Whereas the first Motion, is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*. 137

Experiments in Consort touching the *Magnitude*, and *Exilitie*, and *Damps* of *Sounds*.

Take a *Truncke*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is, for that *Sound* diffuseth it selfe in round; And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be made to goe all into a Canale; It must needs give greater force to the *Sound*. And so you may note, that *Enclosures* doe not onely preserve *Sound*, but also Encrease and Sharpen it. 138

A *Hunters Horne*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause* is, for that the *Aire*, and *Sound*, being first contracted at the lesser End, and afterwards having more Roome to spread at the greater End; doe dilate themselves; And in Comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And even *Hunters Hornes*, which are sometimes made straight, and not Oblique, are ever greater at the lower end. It would be tried also in *Pipes*, being made *far larger* at the lower end: Or being made with a *Belly* towards the lower End; And then issuing into a straight Concave againe. 139

There is in *Saint Iames Fields*, a *Conduit* of *Bricke*, unto which joyneth a *low Vault*; And at the End of that, a *Round House* of Stone: And in the *Bricke Conduit* there is a Window; And in the *Round House* a Slit or Rift of some little breadth: If you cry out in the Rift, it will make a fearfull Roaring at the Window. The *Cause* is the same with the former; For that all *Concaves*, that proceed from more Narrow to more Broad, doe amplifie the *Sound* at the Comming out. 140

Hawkes Bells, that have Holes in the Sides, give a greater Ring, than if the Pellet did strike upon Brasse, in the *Open Aire*. The Cause is the same with the first *Instance* of the *Truncke*; Namely, for that the *Sound* Enclosed with the Sides of the *Bell*, commeth forth at the *Holes* unspent, and more strong. 141

In *Drums*, the Closenesse round about, that preserveth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum-Hole*, farre more loud, and strong, than if you should strike upon the like *Skin*, extended 142

extended

tended in the Open Aire. The *Cause* is the same with the two precedent.

143 *Sounds* are better heard, and further off, in an *Evening*, or in the *Night*, than at the *Noone*, or in the *Day*. The *Cause* is, for that in the *Day*, when the *Aire* is more Thin, (no doubt) the *Sound* pierceth better; But when the *Aire* is more Thicke, (as in the *Night*) the *Sound* spendeth and spreadeth abroad lesse: And so it is a Degree of *Enclosure*. As for the *Night*, it is true also, that the Generall Silence helpeth.

144 There be two Kinds of *Reflexions* of *Sounds*; The one at *Distance*, which is the *Eccho*; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly; Of which we shall speake hereafter: The other in *Concurrence*; When the *Sound* Reflecting (the *Reflexion* being neare at hand) returneth immediatly upon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musicke* upon the water soundeth more; And so likewise *Musicke* is better in Chambers Wainscotted, than Hanged.

145 The *Strings* of a Lute, or Violl, or Virginalls, doe give a far greater *Sound*, by reason of the *Knot*, and *Board*, and *Concave* underneath, than if there were nothing but onely the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the Upper Aire into the Lower. The *Cause* is, the Communication of the Upper Aire with the Lower; And Penning of both from Expence, or Dispersing.

146 An *Irish Harpe* hath Open Aire on both sides of the *Strings*: And it hath the *Concave* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more Resounding *Sound*, than a *Bandora*, *Orpharion*, or *Cittern*, which have likewise *Wire-strings*. I judge the *Cause* to be, for that Open Aire on both Sides helpeth, so that there be a *Concave*; Which is therefore best placed at the End.

147 In a *Virginall*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cause* is, for that all *Shutting in* of *Aire*, where there is no competent Vent, dampeth the *Sound*: Which maintaineth likewise the former *Instance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* somewhat.

148 There is a *Church* at *Glocester*, (and as I have heard the like is in some other places;) where if you speake against a Wall, softly, another shall heare your *Voice* better a good way off, than neare hand. Enquire more particularly of the Frame of that Place. I suppose there is some Vault, or Hollow, or Isle, behinde the Wall, and some Passage to it towards the further end of that Wall, against which you speake; So as the *Voice*, of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the *Aire* of the Hollow; For it is preserved somewhat by the plaine wall; but that is too weake to give a *Sound* Audible, till it hath communicated with the backe *Aire*.

149 Strike upon a *Bow-string*, and lay the *Horne* of the *Bow* neare your Eare, and it will encrease the *Sound*, and make a degree of a *Tone*. The *Cause* is, for that the Sensory, by reason of the Close Holding, is percussed,

cussed, before the Aire dispersed. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse between those two Parts; As appeareth by this; That a Harsh *Grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put upon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, 150
and strike upon the other, it maketh a far greater *Sound*, than the like Stroke upon the *Rod*, not so made Contiguous to the Eare. By which, and by some other *Instances*, that have beene partly touched, it should appeare; That *Sounds* doe not onely slide upon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body.

I remember in *Trinitie Colledge* in *Cambridge*, there was an *Vpper* 151
Chamber, which being thought weake in the Roofe of it, was supported by a Pillar of Iron, of the bignesse of ones Arme, in the middest of the *Chamber*; Which if you had strucke, it would make a little flat Noise in the *Roome* where it was strucke; But it would make a great Bombe in the *Chamber* beneath.

The *Sound* which is made by *Buckets* in a *well*, when they touch up- 152
on the *water*; Or when they strike upon the side of the *well*; Or when two Buckets dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *Open Aire*. The *Cause* is, the Penning and Enclosure of the Aire, in the Concave of the *well*.

Barrells placed in a Roome under the Floare of a *Chamber*, make all 153
Noises in the same Chamber, more Full and Resounding.

So that there be fiue wayes (*in generall*,) of Majoration of Sounds: Enclosure Simple; Enclosure with Dilatation; Communication; Reflexion Concurrent; *and* Approach *to the* Sensory.

For *Exilitie* of the *Voice*, or other *Sounds*: It is certaine, that the 154
Voice doth passe thorow *Solide* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Close Body, and such an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weakenesse*, or *Exilitie*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noise, or Rattle. And so doth the *Aetites*, or *Eagles* Stone, which hath a little Stone within it.

And as for *Water*, it is a certaine Triall: Let a Man goe into a *Bath*, 155
and take a *Paile*, and turne the Bottome upward, and carry the Mouth of it, (Even,) downe to the Levell of the *Water*; and so presse it downe under the *Water*, some handfull and an halfe, still keeping it even, that it may not tilt on either side, and so the Aire get out: Then let him that is in the *Bath*, dive with his Head so far under *water*, as he may put his Head into the *Paile*; and there will come as much *Aire* bubling forth, as will make

make Roome for his Head. Then let him speake; and any that shall stand without, shall heare his *Voice* plainly; but yet made extreme sharpe and exile, like the *Voice* of *Puppets*: But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handsomely done, if the *Paile* be put over the Mans head above Water, and then he cowre downe, and the *Paile* be pressed downe with him. Note that a Man must kneele or sit, that he may be lower than the *Water*. A Man would thinke, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith; That *Hercules Page Hylas* went with a Water-pot, to fill it at a pleasant *Fountaine*, that was neere the Shore, and that the *Nymphs* of the *Fountaine* fell in love with the Boy, and pulled him vnder *Water*, keeping him alive; And that *Hercules* missing his *Page*, called him by his Name, aloud, that all the Shore rang of it; And that *Hylas* from within the Water, answered his Master; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had beene three miles off, when the *Fountaine* (indeed) was fast by.

156 In *Lutes*, and *Instruments* of *Strings*, if you stop a *String* high, (whereby it hath lesse Scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and strike the Edge of the one against the Bottome of the other, within a *Paile* of *Water*; And you shall finde, that as you put the Sawcers lower, and lower, the Sound groweth more flat; even while Part of the *Sawcer* is above the Water; But that Flatnesse of *Sound* is joyned with a Harshnesse of *Sound*; which (no doubt) is caused by the Inequalitie of the *Sound*, which commeth from the Part of the *Sawcer* under the *Water*, and from the Part above. But when the *Sawcer* is wholly under the *Water*, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from afarre off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*: As if a Bell hath Cloth, or Silke wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericalls*, the Keyes are lined; And in Colledges they use to line the Tablemen.

159 Triall was made in a *Recorder*, after these severall manners. The Bottome of it was set against the Palme of the Hand; stopped with Wax round about; set against a Damaske Cushion; Thrust into Sand; Into Ashes; Into Water, (halfe an Inch under the Water;) Close to the Bottome of a Silver Basin; And still the *Tone* remained: But the Bottome of it was set against a Woollen Carpet; A Lining of Plush; A Locke of Wooll, (though loosely put in;) Against Snow; And the Sound of it was quite deaded, and but Breath.

160 *Iron* Hot produceth not so full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more Soft, and lesse Resounding. So likewise *Warme Water*, when it falleth, maketh not so full a *Sound*, as *Cold*: And I conceive it is softer, and neerer the Nature of Oyle; For it is more slippery; As may be perceived, in that it scowreth better.

161 Let there be a *Recorder* made, with two Fipples, at each end one; The *Truncke*

Truncke of it of the length of two *Recorders*, and the Holes answerable towards each end; And let two play the same Lesson upon it, at an Unison; And let it be noted, whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two Truncks (thorow-out) hollow; And let two speake, or sing, the one long-wayes, the other traverse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also give light to the *Mixture* of *Sounds*; whereof we shall speake hereafter.

A *Bellowes* blowne in at the *Hole* of a *Drum*, and the *Drum* then stricken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindreth the Issue of the *Sound*; And partly for that it maketh the Aire, being blowne together, lesse moveable. 162

THe *Loudnesse*, and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exilitie* of *Sounds*; For a *Base String*, though softly stricken, giveth the greater *Sound*; But a *Treble String*, if hard stricken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more Aire; And the *Treble* lesse Aire, but with a sharper Percussion.

Experiments in Consort touching the *Loudnesse* or *Softnesse* of *Sounds*; and their *Carriage* at longer or shorter Distance.

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a Horne stronger or weaker; Ringing of a Hand-bell; harder or softer &c. And the *Strength* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a Cloth, it will give a lesse *Sound*; If against Wood, a greater; If against Metall, yet a greater; And in Metals, if you strike against Gold, (which is the more pliant,) it giveth the flatter *Sound*; If against Silver, or Brasse, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore we see in discharging of a *Peece*, what a great Noise it maketh. We see also, that the Charge with Bullet; Or with Paper wet, and hard stopped; Or with Powder alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report. 163 164

The *Sharpnesse* or *Quickenesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *Strength*: As in a Whip, or Wand, if you strike the Aire with it; the Sharper & Quicker you strike it, the *Louder Sound* it giveth. And in playing upon the *Lute*, or *Virginalls*, the quicke Stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking cutteth the Aire speedily; whereas the Soft Striking, doth rather beat, than cut. 165

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Empty Vessells, &c.) hath been touched obiter, in the *Majoration* of *Sounds*: But it is fit also to make a *Title* of it apart.

Experiments in Consort touching the *Communication* of *Sounds*.

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166 The *Experiment* for greatest Demonstration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you strike with a Hammer upon the Upper Part, and then upon the Midst, and then upon the Lower, you shall finde the *Sound* to be more Treble, and more Base, according unto the Concave, on the Inside; though the Percussion be onely on the Outside.

167 When the *Sound* is created betweene the *Blast* of the *Mouth*, and the *Aire* of the *Pipe*, it hath nevertheless some *Communication* with the Matter of the Sides of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe*, or *Trumpet*, of Wood, and Brasse, the *Sound* will be divers; So if the *Pipe* be covered with *Cloth*, or *Silke*, it will give a divers *Sound*, from that it would doe of it selfe; So, if the *Pipe* be a *little wet* on the *Inside*, it will make a differing *Sound*, from the same *Pipe dry*.

168 That *Sound* made within *water*, doth communicate better with a hard Body thorow *water*, than made in *Aire*, it doth with *Aire*; *Vide Experimentum*, 134.

Experiments in Consort touching Equality, and Inequality of Sounds.

We have spoken before (in the *Inquisition* touching *Musicke*,) of *Musicall Sounds*, whereunto there may be a Concord or Discord in two Parts; Which *Sounds* we call *Tones*; And likewise of *Immusicall Sounds*; And have given the *Cause*, that the *Tone* proceedeth of *Equalitie*, and the other of *Inequalitie*. And we have also expressed there, what are the *Equall Bodies* that give *Tones*, and what are the *Vnequall* that give none. But how we shall speake of such *Inequalitie* of *Sounds*, as proceedeth, not from the Nature of the Bodies themselves, but is Accidentall; Either from the *Roughnesse*, or *Obliquitie* of the *Passage*; or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it have a *Rift* in it, whereby the *Sound* hath not a cleare Passage, giveth a *Hoarse* and *Iarring Sound*; So the *Voice* of *Man*, when by Cold taken the Weasill groweth rugged, and (as wee call it) furred, becommeth hoarse. And in these two *Instances*, the *Sounds* are Ingrate; because they are meerely *Vnequall*: But, if they be *Vnequall* in *Equalitie*, then the *Sound* is Gratefull, but Purling.

170 All *Instruments*, that have either *Returnes*, as Trumpets; Or *Plexions*, as Cornets; Or are *Drawne up*, and *put from*, as Sackbuts; have a *Purling Sound*: But the *Recorder*, or *Flute*, that have none of these *Inequalities*, give a cleare *Sound*. Nevertheless, the *Recorder* it selfe, or *Pipe* moistened a little in the Inside, soundeth more solemnly, and with a little Purling, or Hissing. Againe, a *Wreathed String*, such as are in the Base Strings of *Bandores*, giveth also a *Purling Sound*.

171 But a *Base-string*, if it be meerely *Vnequall* in his Parts, giveth a Harsh and

and Untuneable *Sounds*; which *Strings* we call *False*, being bigger in one Place than in another; And therefore *Wire-strings* are never *False*. Wee see also, that when we try a *False Lute-string*, wee use to extend it hard betweene the fingers, and to fillip it; And if it giveth a double *Species*, it is *True*; But if it giveth a treble, or more, it is *False*.

172 *Waters*, in the *Noise* they make as they runne, represent to the Eare a *Trembling Noise*; And in *Regalls*, (where they have a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall Trembling: And Children have also little Things they call *Cockes*, which have *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling* of *Water*, hath an affinitie with the Letter *L*. All which *Inequalities* of *Trepidation*, are rather pleasant, than otherwise.

173 All *Base Notes*, or very *Treble Notes*, give an Asper *Sound*; For that the *Base* striketh more Aire, than it can well strike equally: And the *Treble* cutteth the Aire so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane*, or *Tenor*, is the sweetest Part.

174 We know Nothing, that can at pleasure make a *Musicall*, or *Immusicall Sound*, by voluntary *Motion*, but the *Voice* of *Man*, and *Birds*. The *Cause* is, (no doubt) in the Weasill or Wind-pipe, (which we call *Aspera Arteria*,) which being well extended, gathereth *Equalitie*; As a Bladder that is wrinckled, if it be extended, becommeth smooth. The Extension is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can never give a *Tone*: And in *Singing*, there is (manifestly) a greater Working and Labour of the Throat, than in *Speaking*; As appeareth in the Thrusting out, or Drawing in of the Chinne, when we sing.

175 The *Humming* of *Bees*, is an *Vnequall Buzzing*; And is conceived, by some of the Ancients, not to come forth at their Mouth, but to be an *Inward Sound*; But (it may be) it is neither; But from the motion of their Wings; For it is not heard but when they stirre.

176 All *Metals quenched* in *Water*, give a Sibilation or Hissing Sound; (which hath an Affinitie with the letter Z.) notwithstanding the *Sound* be created betweene the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there be but small Store of *Water*, in a Vessell, giveth a Hissing *Sound*; But *Boyling* in a full Vessell, giveth a Bubling *Sound*, drawing somewhat neare to the *Cocks* used by Children.

177 Triall would be made, whether the *Inequalitie*, or Interchange of the *Medium*, will not produce an *Inequalitie* of *Sound*; As if three *Bells* were made one within another, and Aire betwixt Each; And then the outermost *Bell* were chimed with a Hammer, how the *Sound* would differ from a Simple *Bell*. So likewise take a *Plate* of *Brasse*, and a *Planck* of *Wood*, and joyne them close together, and knock upon one of them, and see if they do not give an *unequall Sound*. So make two or three *Partitions* of *Wood* in a *Hogshead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshead*, without such *Partitions*.

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Experiments in Conſort, touching the more Treble, and the more Baſe Tones, or Muſicall Sounds.

178 IT is evident, that the *Percuſſion* of the *Greater Quantitie of Aire*, causeth the *Baſer Sound*; And the leſſe *Quantitie*, the more *Treble Sound*: The *Percuſſion* of the *Greater Quantitie of Aire*, is produced by the *Greatneſſe of the Body Percuſſing*; By the *Latitude* of the *Concave*, by which the *Sound* paſſeth; and by the *Longitude* of the ſame *Concave*. Therefore wee ſee that a *Baſe ſtring*, is greater than a *Treable*; A *Baſe Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Baſe Sound* they yeeld; And the nearer the Mouth, the more *Treble*. Nay more, if you ſtrike an *Entire Body*, as an *Andiron* of *Braſſe*, at the Top, it maketh a more *Treble Sound*; And at the Bottome a *Baſer*.

179 It is alſo evident, that the *Sharper* or *Quicker Percuſſion of Aire* cauſeth the more *Treble Sound*; And the *Slower* or *Heavier*, the more *Baſe Sound*. So we ſee in *Strings*; the more they are wound up, and ſtrained; (And thereby give a more quicke Start-backe;) the more *Treble* is the *Sound*; And the ſlacker they are, or leſſe wound up, the *Baſer* is the *Sound*. And therefore a Bigger *String* more ſtrained, and a Leſſer *String*, leſſe ſtrained, may fall into the ſame *Tone*.

180 *Children*, *Women*, *Eunuchs* have more ſmall and ſhrill *Voices*, than *Men*. The Reaſon is, not for that *Men* have greater Heat, which may make the *Voice* ſtronger, (for the ſtrength of a *Voice* or *Sound*, doth make a difference in the *Loudneſſe* or *Softneſſe*, but not in the *Tone*;) But from the Dilatation of the Organ; which (it is true) is likewiſe cauſed by Heat. But the Cauſe of *Changing* the *Voice*, at the yeares of Puberde, is more obſcure. It ſeemeth to be, for that when much of the Moiſture of the Body, which did before irrigate the Parts, is drawne downe to the Spermaticall veſſels; it leaveth the Body more hot than it was; whence commeth the Dilatation of the Pipes: For we ſee plainly, all Effects of Heat, doe then come on; As Piloſitie, more Roughneſſe of the Skinne, Hardneſſe of the Fleſh, &c.

181 The Induſtry of the *Muſitian*, hath produced two other Meanes of *Straining*, or *Intenſion of Strings*, beſides their *Winding up*. The one is the *Stopping* of the *String* with the *Finger*; As in the Necks of Lutes, Viols, &c. The other is the *Shortneſſe* of the *String*; As in Harps, Virginalls, &c. Both theſe have one, and the ſame reaſon; For they cauſe the *String* to give a quicker Start.

182 In the *Straining* of a *String*, the further it is ſtrained, the leſſe *Superſtraining* goeth to a *Note*; For it requireth good Winding of a String, before it will make any Note at all: And in the Stops of Lutes, &c. the higher they goe, the leſſe Diſtance is betweene the Frets.

183 If you fill a *Drinking Glaſſe* with *Water*, (eſpecially one Sharp below, and Wide above,) and ſillip upon the Brim, or Outſide; And after empty Part of the *Water*, and ſo more and more, and ſtill try the *Tone* by Filipping; you ſhall finde the *Tone* fall, and be more *Baſe*, as the *Glaſſe* is made Emptier.

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Experiments in Conſort touching the *Proportion* of *Treble* and *Baſe Tones*.

The Juſt and Meaſured *Proportion* of the *Aire Percuſſed*, towards the *Baſeneſſe* or *Trebleneſſe* of *Tones*, is one of the greateſt Secrets in the Contemplation of *Sounds*. For it diſcovereth the true *Coincidence* of *Tones* into *Diapaſons*; Which is the Returne of the ſame *Sound*. And ſo of the *Concords* and *Diſcords*, betweene the *Vniſon*, and *Diapaſon*; Which we have touched before, in the *Experiments* of *Muſicke*; but thinke fit to reſume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may bee found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Diſtance* of *Frets*; And in the *Proportion* of the *Concave* of *Pipes*, &c. But moſt commodiouſly in the laſt of theſe.

Try therefore the *Winding* of a *String* once about, as ſoone as it is brought to that Extenſion, as will give a *Tone*; And then of twice about; And thrice about, &c. And marke the Scale or Difference of the Riſe of the *Tone*: Whereby you ſhall diſcover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimenſion* of the *Winding*; And the *Proportion* likewiſe of the *Sound* towards the *String*, as it is more or leſſe ſtrained. But note that to meaſure this, the way will bee, to take the Length in a right Line of the *String*, upon any Winding about of the Pegge. 184

As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the firſt Stope of the *String*, unto ſuch a Stop as ſhall produce a *Diapaſon* to the former Stop, upon the ſame *String*. 185

But it will beſt (as it is ſaid) appeare, in the *Bores* of *Wind-Inſtruments*: And therefore cauſe ſome halfe dozen *Pipes*, to be made, in length, and all things elſe, alike, with a ſingle, double, and ſo on to a ſextuple *Bore*; And ſo marke what Fall of *Tone* every one giveth. But ſtill in theſe three laſt *Inſtances*, you muſt diligently obſerve, what *length* of *String*, or *Diſtance* of *Stop*, or *Concave* of *Aire*, maketh what *Riſe* of *Sound*. As in the laſt of theſe (which (as we ſaid) is that, which giveth the apteſt demonſtration,) you muſt ſet downe what Encreaſe of *Concave* goeth to the Making of a *Note* higher; And what of two *Notes*; And what of three *Notes*, And ſo up to the *Diapaſon*: For then the great Secret of *Numbers*, and *Proportions*, will appeare. It is not unlike, that thoſe that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewiſe *Bell-founders* in fitting the tune of their *Belles*. So that Enquiry may ſave Triall. Surely, it hath beene obſerved by one of the *Ancients*, that an *Empty Barrell* knocked upon with the finger, giveth a *Diapaſon* to the *Sound* of the like *Barrell full*; But how that ſhould be, I doe not well underſtand; For that the knocking of a *Barrell-full*, or *Empty*, doth ſcarce give any *Tone*. 186

187 There is required some sensible Difference in the *Proportion* of creating a *Note* towards the *Sound* it selfe, which is the Passive: And that it bee not too neare, but at a distance. For in a *Recorder*, the three uppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the Winding or Stopping of *Strings*.

Experiments in Consort touching *Exteriour*, and *Interiour Sounds*.

There is another Difference of *Sounds*, which we will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musicall*, nor *Immusicall*: Though it be true, that there can be no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may bee both *Musicall* and *Immusicall*. We shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that we meane) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

188 In *Speech* of *Man*, the *Whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can never make a *Tone*, nor sing in *whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowes*, or *Wind*, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concave*, (though soft) is an *Exteriour*. So likewise, the greatest *Winds*, if they have no Coarctation, or blow not hollow, give an *Interiour Sound*; The Whistling or hollow *Wind* yeeldeth a Singing, or *Exteriour Sound*; The former being pent by some other Body; The latter being pent in by his owne Density: And therefore we see, that when the *Wind* bloweth hollow, it is a Signe of Raine. The *Flame*, as it moveth within it selfe, or is blowne by a *Bellowes*, giveth a Murmur or *Interiour Sound*.

189 There is no *Hard Body*, but strucke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: In so much as if the Percussion be over-soft, it may induce a Nullity of *Sound*; But never an *Interiour Sound*; As when one treadeth so softly, that hee is not heard.

190 Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it never giveth an *Exteriour Sound*; As if you blow strongly with a Bellowes against a Wall.

191 *Sounds* (both *Exteriour* and *Interiour*,) may be made, as well by *Section*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

Experiments in Consort, touching *Articulation of Sounds*.

192 It is evident, and it is one of the strangest Secrets in *Sounds*, that the *whole Sound* is not in the *whole Aire* only; But the *whole Sound* is also in every small *Part* of the *Aire*. So that all the curious Diversity of *Articulate*

Sounds, of the Voice of Man, or Birds, will enter at a small Cranny, Inconfused.

193 The *frequent Agitation* of the *winds*, and the like, though they bee materiall to the Carriage of the *Sounds*, further, or lesse way; yet they doe not confound the *Articulation* of them at all, within that distance that they can be heard; Though it may be, they make them to be heard lesse Way, than in a Still; as hath beene partly touched.

194 Over-great Distance confoundeth the *Articulation* of *Sounds*; As we see, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot distinguish what he saith. And one *Articulate Sound* will confound another; As when many speake at once.

195 In the *Experiment* of *Speaking under water*, when the Voice is reduced to such an Extreame Exility, yet the *Articulate Sounds*, (which are the *Words*) are not confounded; as hath beene said.

196 I conceive, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Dispersing*: And although (as was formerly said) a *Sound Articulate*, already created, will bee contracted into a small Cranny; yet the first *Articulation* requireth more Dimension.

197 It hath beene observed, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewise in the Roofe, a Preacher cannot be heard so well, as in the like Places not so Vaulted. The Cause is, for that the *Subsequent Words* come on, before the *Precedent words* vanish: And therefore the *Articulate Sounds* are more confused, though the Grosse of the *Sound* be greater.

198 The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the severall *Alphabeticall Letters*, are worthy Enquiry, and pertinent to the present *Inquisition* of *Sounds*: But because they are subtill, and long to describe, wee will refer them over, and place them amongst the *Experiments* of *Speech*. The *Hebrewes* have beene diligent in it, and have assigned, which *Letters* are *Labiall*, which *Dentall*, which *Gutturall* &c. As for the *Latines*, and *Grecians*, they have distingvished betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Mutæ Tenues*, *Mediæ*, and *Aspiratæ*; Not amisse. But yet not diligently enough. For the speciall *Strookes*, & *Motions*, that create those *Sounds*, they have little enquired: As that the *Letters*, *B. P. F. M.* are not expressed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters N.* and *B.* cannot bee pronounced, but that the *Letter N.* will turne into *M.* As *Hecatomba*, will be *Hecatomba*. That *M.* and *T.* cannot be pronounced together; but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the Making of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

199 The *Lungs* are the most Spongy Part of the Body; And therefore ablest to contract, and dilate it selfe; And where it contracteth it selfe,

it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Pallate*, and the rest of those they call *Instruments* of *voice*.

200 There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that have no *Voice Articulate*; and divers *Letters* of *Articulate Voices*: And commonly Men have given such Names to those *Sounds*, as doe allude unto the Articulate Letters. As *Trembling* of *water* hath Resemblance with the *Letter L*; *Quenching* of *Hot Metalls*, with the *Letter Z*; *Snarling* of *Dogs*, with the *Letter R*; The *Noise of Scritchowles*, with the *Letter Sh*; *Voice* of *Cats*, with the *Dypthong Ew*; *Voice* of *Cuckoes*, with the *Dypthong Ou*; *Sounds* of *Strings*, with the *Letter Ng*: So that if a Man, (for Curiosity, or Strangenesse sake,) would make a *Puppet* or other Dead Body, to pronounce a *word*; Let him consider, on the one Part, the Motion of the *Instruments* of *Voice*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformity there is that causeth the Similitude of *Sounds*; And by that he may minister light to that Effect.

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NATV-

NATVRALL HISTORIE.

III. Century.

ALL *Sounds* (whatsoever) move Round; That is to say; On *all Sides*; *Vpwards*; *Downewards*; *Forwards*; and *Backwards*. This appeareth in all *Instances*.

201 Experiments in Consort touching the *Motions* of *Sounds*, in what *Lines* they are *Circular*, *Oblique*, *Straight*; *Vpwards*, *downwards*; *Forwards*, *Backwards*.

Sounds do not require to be conveyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but may bee *Arched*; Though it bee true, they move strongest in a *Right Line*; Which nevertheless is not caused by the *Rightnesse* of the *Line*, but by the Shortnesse of the distance; *Linea recta brevissima*. And therefore wee see, if a *wall* be betweene, and you speake on the one Side, you heare it on the other; Which is not because the *Sound* Passeth thorow the *wall*; but *Archeth* over the *wall*.

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If the *Sound* be *Stopped* and *Repercussed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one side of the Boot be downe, and the other up; And a Begger beg on the Close Side; you would thinke that hee were on the Open Side. So likewise, if a *Bell* or *Clocke*, bee (for Example) on the North-side of a Chamber; And the Window of that Chamber be upon the South; He that is in the Chamber will thinke the *Sound* came from the South.

203

Sounds, though they *spread round*, (so that there is an *Orbe*, or *Sphericall Area* of the *Sound*;) yet they move strongest, and goe furthest in the *Fore-lines*, from the first Locall Impulsion of the Aire. And therefore in *Preaching*, you shall heare the *Preachers* Voice, better, before the Pulpit, than behinde it, or on the Sides, though it stand open. So a *Harquebuz*, or *Ordinance*, will bee further heard, forwards, from the Mouth of the *Peece*, than backwards, or on the Sides.

204

It may bee doubted, that *Sounds* doe move better, Downwards than

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than Upwards. *Pulpits* are placed high above the People. And when the Ancients *Generalls* spake to their Armies, they had ever a Mount of Turfe cast up, whereupon they stood: But this may bee imputed to the Stops and Obstacles, which the voice meeteth with, when one speaketh upon the levell. But there seemeth to be more in it: For it may be, that *Spirituall Species*, both of *Things Visible* and *Sounds*, doe move better *Downewards* than *Vpwards*. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of Pauls, seeme much lesse than they are, and cannot bee knowne; But to Men above, those below seeme nothing so much lessened, and may bee knowne: yet it is true, that all things to them above, seeme also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Upper window, or Tarras.

206 But to make an exact Triall of it, let a Man stand in a *Chamber*, not much above the Ground, and speake out at the windowe, thorough a *Trunke*, to one standing on the Ground, as softly as hee can, the other laying his Eare close to the *Trunke*: Then *vice versa*, let the other speake *below* keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Trunck*: And this may bee the aptest Meanes, to make a Judgement, whether *Sounds* descend, or ascend, better.

Experiments in Consort touching the Lasting of Sounds.

207 AFter that *Sound* is created, (which is in a moment,) wee finde it continueth some small time, melting by little and little. In this there is a wonderfull Errour amongst Men, who take this to be a *Continuance* of the First *Sound*; whereas (in truth) it is a *Renovation*, and not a *Continuance*. For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String strucken, which is thought to bee a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a Virginall, as soone as ever the Jacke falleth; and toucheth the String, the Sound ceaseth: And in a Bell, after you have chimed upon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish that there are two *Trepidations*: The one Manifest, and Locall; As of the Bell, when it is Pensile: The other Secret, of the Minute Parts; such as is described in the 9th Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while; after you have plaied; But that is but while the Bellowes are in Falling.

208 It is certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will bee carried, (at the least) twenty Miles upon the land; and much further upon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs be a *Continuance* of the *First Sound*; For there is no *Trepidation* which should renew it. And the

the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more than Momentany.

To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and have with him a Taper; And let some Vaile be put before the Taper; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell; And in the same Instant withdraw the Vaile; And so let him in the Field tell by his Pulse what distance of *Time* there is, betweene the *Light seene*, and the *Sound heard*: For it is certaine that the *Delation* of Light is in an Instant. This may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*. 209

It is generally knowne and observed, that *Light*, and the *Object* of *Sight*, move swifter than *Sound*; For we see the *Flash* of a Peece is seene sooner, than the *Noise* is heard. And in Hewing wood, if one be some distance off, he shall see the Arme lifted up for a second Stroke, before he heare the Noise of the first. And the greater the Distance, the greater is the Prevention: As we see in Thunder, which is farre off; where the Lightning Precedeth the Cracke a good space. 210

Colours, when they represent themselves to the Eye, fade not, nor melt not by Degrees, but appeare still in the same Strength; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire*, (as a Cause *Sine quâ non*,) in that, it perisheth so suddenly; For in every Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe; which the *Water* also doth, but nothing so swiftly. 211

Experiments in Consort touching the *Passage* and *Interceptions* of *Sounds*.

In the Trialls of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing By the sides* of a Body, for the *Passing thorow* a Body: And therefore you must make the *Intercepting* Body very close; For *Sound* will passe thorow a small Chincke.

212 Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water*; thorow a *Wall*; thorow *Metall*, as in Hawkes Bells stopped; &c.) the *Hard*, or *Close Body*, must be but thinne and small; For else it deadeth and extinguisheth the *Sound* utterly. And therefore, in the *Experiment* of *Speaking in Aire under Water*, the Voice must not be very deepe within the *Water*: For then the *Sound* pierceth not. So if you speake on the further side of a *Close Wall*, if the *Wall* be very thicke, you shall not be heard: And if there were an Hogshead emptie, whereof the Sides were some two Foot thicke, and the Bunghole stopped; I conceive the Resounding Sound, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none: But onely you shall heare the *Noise* of the Outward Knocke, as if the Vessell were full.

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213 It is certaine, that in the *Passage* of *Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are strucke, than when the Percussion is onely within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped up, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell give any *Sound* at all, or how weake? But note, that you must in stead of the Threed, take a Wire; Or else let the Glasse have a great Belly; lest when you shake the Bell, it dash upon the Sides of the Glasse.

214 It is plaine, that a very *Long*, and *Downe-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard over a wall, will not be heard over a Church; Nor that *Sound*, which will be heard, if you stand some distance from the wall, will be heard if you stand close under the wall.

215 *Soft* and *Foraminous Bodies*, in the *first Creation* of the *Sound*, will dead it; For the Striking against Cloth, or Furre, will make little *Sound*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As we see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windowes, if they be very Close, will checke a *Sound* more, than the like Thicknesse of Cloth. Wee see also, in the Rumbling of the Belly, how easily the *Sound* passeth thorow the Guts, and Skin.

216 It is worthy the Enquiry, whether *Great Sounds*, (As of Ordnance, or Bells,) become not more *Weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds*, (it may be,) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps,) not so well.

Experiments in Consort touching the *Medium* of *Sounds*.

THe *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *Water*.

And *Hard Bodies* refuse not altogether to be *Mediums* of *Sounds*. But all of them are dull and unapt *Deferents*, except the *Aire*.

217 In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Evening Sounds*;

218 And *Sounds* in moist Weather, and Scutherne Winds. The reason is already mentioned in the *Title* of *Majoration* of *Sounds*; Being for that *Thinne Aire* is better pierced: but *Thicke Aire* preserveth the *Sound* better from Waste, Let further Triall be made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *Sound*.

219 How farre forth *Flame* may be a *Medium* of *Sounds*, (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tryed, in *Speaking* where a *Bonfire* is betweene; But then you must allow, for the disturbance, the *Noise* that the *Flame* it selfe maketh.

220 Whether any other *Liquours*, being made *Mediums*, cause a Diversitie of *Sound* from *Water*, it may be tryed: As by the Knapping of the Tongs; Or Striking of the Bottome of a vessell, filled either with Milke, or

or with Oyle; which though they be more light, yet are they more unequall Bodies than Aire.

Of the Natures *of the* Mediums, *we have now spoken*; *As for the* Disposition *of the said* Mediums, *it doth consist in the Penning, or not Penning of the Aire*: *Of which we have spoken before, in the* Title of Delation *of* Sounds: *It consisteth also in the* Figure *of the* Concave, *through which it passeth*; *Of which we will speake next.*

Experiments in Consort, what the *Figures* of the *Pipes*, or *Concaves*, or the *Bodies Deferent*, conduce to the *Sounds*.

How the *Figures* of *Pipes*, or *Concaves*, through which *Sounds* passe; Or of other *Bodies deferent*; conduce to the Varietie and Alteration of the *Sounds*; Either in respect of the *Greater Quantitie*, or *lesse Quantitie* of *Aire*, which the *Concaves* receive; Or in respect of the *Carrying* of *Sounds* longer or shorter way; Or in respect of many other *Circumstances*; they have beene touched, as falling into other *Titles*. But those *Figures*, which we now are to speake of, wee intend to be, as they concerne the *Lines*, through which *Sound* passeth; As *Straight*; *Crooked*; *Angular*; *Circular*; &c.

221 The *Figure* of a *Bell* pertaketh of the *Pyramis*, but yet comming off, and dilating more suddenly. The *Figure* of a *Hunter's Horne*, and *Cornet*, is oblique; yet they have likewise *Straight Hornes*; which if they be of the same Bore with the *Oblique*, differ little in *Sound*; Save that the Straight require somewhat a stronger Blast. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are straight; But the *Recorder* hath a lesse Bore, and a greater; Above, and below. The *Trumpet* hath the *Figure* of the *Letter S*: which maketh that Purling *Sound*, &c. Generally, the *Stright Line* hath the cleanest and roundest *Sound*, And the *Crooked* the more Hoarse, and Jarring.

222 Of a *Sinuous Pipe*, that may have some foure Flexions, Triall would be made. Likewise of a *Pipe*, made like a *Crosse*, open in the middest. And so likewise of an *Angular Pipe*: And see what will be the Effects of these severall *Sounds*. And so againe of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a Hole whereinto you shall blow; And another Hole not farre from that; But with a Traverse or Stop between them; So that your Breath may goe the Round of the *Circle*, and come forth at the second Hole. You may trie likewise *Percussions* of *Solide Bodies* of severall *Figures*; As *Globes*, *Flats*, *Cubes*, *Crosses*, *Triangles*, &c. And their *Combinations*; As *Flat* against *Flat*; And *Convex* against *Convex*; And *Convex* against *Flat*, &c. And marke well the diversities of the *Sounds*. Trie also the difference in *Sound* of severall *Crassitudes* of *Hard Bodies* percussed. And like knowledge of the diversities of the *Sounds*. I my selfe have tried, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferiour to that of *Silver*, or *Brasse*, but rather better: yet wee see that a peece

peece of Money of *Gold* soundeth farre more flat than a peece of Money of *Silver*.

223 The *Harpe* hath the *Concave*, not along the *Strings*, but acrosse the *Strings*; And no *Instrument* hath the *Sound* so Melting, and Prolonged, as the *Irish Harpe*. So as I suppose, that if a *Virginall* were made with a double *Concave*; the one all the length as the *Virginall* hath; the other at the End of the *Strings*, as the *Harpe* hath; It must needs make the *Sound* perfecter, and not so Shallow, and Jarring. You may trie it, without any Sound-Board along, but onely Harp-wise, at one End of the *Strings*: Or lastly with a double *Concave*, at Each end of the *Strings* one.

Experiments in Consort, touching the Mixture of Sounds.

224 THere is an apparent Diversitie between the *Species Visibile*, and *Audibile*, in this; That the *Visible* doth not *mingle* in the *Medium*, but the *Audible* doth. For if we looke abroad, we see Heaven, a number of Stars; Trees, Hills, Men, Beasts, at once. And the *Species* of the one doth not confound the other. But if so many *Sounds* came from severall Parts, one of them would utterly confound the other. So wee see, that *Voices* or *Consorts* of *Musicke* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true nevertheless, that a great *Light* drowneth a smaller, that it cannot be seene; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a lesser. And I suppose likewise, that if there were two Lanthornes of Glasse, the one a Crimsin, and the other an Azure, and a Candle within either of them, those Colotired Lights would mingle and cast upon a White Paper a Purple Colour. And even in *Colours*, they yeeld a faint and weake *Mixture*: For white walls make Roomes more lightsome than blacke, &c. But the Cause of the *Confusion* in *Sounds*, and the *Inconfusion* in *Species Visible*, is, For that the *Sight* worketh in Right Lines, and maketh severall *Cones*; And so there can be no Coincidence in the Eye, or Visuall Point: But *Sounds*, that move in Oblique and Arcuate Lines, must needs encounter, and disturbe the one the other.

225 The sweetest and best *Harmony* is, when every *Part*, or *Instrument*, is not heard by it selfe, but a Conflation of them all; Which requireth to stand some distance off. Even as it is in the *Mixture* of Perfumes; Or the Taking of the Smells of severall *Flowers* in the *Aire*.

226 The *Disposition* of the *Aire*, in other *Qualities*, except it be joyned with *Sound*, hath no great Operation upon *Sounds*: For whether the *Aire* be lightsome or darke, hot or cold, quiet or stirring, (except it be with *Noise*) sweet-smelling, or stinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

227 But *Sounds* doe disturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one jarring and discording with the other, and making a Confusion; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

228 Two *Voices* of like *lowdnesse*, will not be heard, twice as farre, as one of

of them alone; And two *Candles* of like light, will not make Things seeme twice as farre off, as one. The Cause is profound; But it seemeth that the *Impressions* from the *Objects* of the *Senses*, doe *mingle* respectively, every one with his kinde; But not in proportion, as is before demonstrated: And the reason may be, because the first *Impression*, which is from *Privative* to *Active*, (As from *Silence* to *Noise*, or from *Darkenesse* to *Light*,) is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse Light*, to *More Light*. And the Reason of that againe may be; For that the *Aire*, after it hath received a Charge, doth not receive a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of Vertue, generally, what Proportion it beareth to the Encrease of the Matter, it is a large Field, and to be handled by it selfe.

Experiments in Consort touching *Melioration* of *Sounds*.

229 ALL *Reflexions Concurrent* doe make *Sounds* Greater; But if the Body that reflecteth, either, the Originall *Sound*, or the *Reflexion*, be cleane and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the Belly of polished Brasse, in stead of Wood. Wee see that even in the Open Aire, the *wire String* is sweeter, than the *String* of *Guts*. And wee see that for *Reflexion*, *Water* excelleth; As in *Musicke* neare the *water*; Or in *Eccho's*.

230 It hath beene tried, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more solemne *Sound*, than if the *Pipe* were dry: But yet with a sweet Degree of *Sibilation*, or *Purling*; As we touched it before in the title of *Equalitie*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) betweene dry and wet, become a little more Even and Smooth; But the Purling, (which must needs proceed of Inequalitie,) I take to be bred between the Smoothnesse of the inward Surface of the *Pipe*, which is wet; And the Rest of the Wood of the *Pipe*, unto which the Wet commeth not, but it remaineth dry.

231 In *Frosty weather*, *Musicke* within doores soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the *Wood* or *String* of the *Instrument*, which is made more Crispe, and so more porous and hollow: And we see that *Old Lutes* sound better than *New*, for the same reason. And so doe *Lute-strings* that have beene kept long.

232 *Sound* is likewise *Meliorated* by the *Mingling* of *Open Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot over the Strings; yet so, as there be Roome enough for the Strings, and Roome enough to play below that Belly. Triall may be made also of an *Irish Harpe*, with a Concave on both Sides; Whereas it useth to have it but on one Side. The doubt may be, lest it should make too much Resounding; whereby one Note would overtake another.

233 If you sing into the Hole of a *Drum*, it maketh the *Singing* more sweet.

sweet. And so I conceive it would, if it were a *Song* in Parts, sung into severall *Drums*; And for handsomenesse and strangenesse sake, it would not be amisse to have a Curtaine betweene the Place where the *Drums* are, and the *Hearers*.

234 When a *Sound* is created in a *wind-Instrument*, betweene the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a Trumpet, or *Pipe* of *Wood*; And againe in a *Trumpet* or *Pipe* of *Brasse*. It were good to try *Recorders* and *Hunters Hornes* of *Brasse*, what the *Sound* would be.

235 *Sounds* are *meliorated* by the *Intension* of the *Sense*, where the *Common Sense* is collected most, to the *particular Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blind Men, than to Others: And it is manifest, that betweene *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musicke* is farre sweeter, than when one is *fully Waking*.

Experiments in Consort touching the Imitation of Sounds.

236 IT is a Thing strange in Nature, when it is attentively considered; How *Children*, and some *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many Essayes and Proffers: But all this dischargeth not the Wonder. It would make a Man thinke (though this which wee shall say may seeme exceeding strange) that there is some *Transmission* of Spirits; and that the *Spirits* of the *Teacher* put in Motion, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest Secrets in Nature,) wee shall speake in due place; Chiefly when wee come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a pre-disposition to *Imitate*. We see how ready Apes and Monkies are, to *imitate* all Motions of Man: And in the Catching of Dottrells, we see, how the Fooliſh Bird playeth the Ape in Gestures: And no Man (in effect) doth accompany with others, but he learneth, (ere he is aware,) some Gesture, or Voice, or Fashion of the other.

237 In *Imitation* of *Sounds*, that *Man* should be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like, given them for the *Imitation*; And besides, you shall have Parrots, that will not onely *imitate* Voices, but Laughing, Knocking, Squeaking of a Doore upon the Hinges, or of a Cart-wheele; And (in effect) any other *Noise* they heare.

238 No *Beast* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape it

it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I have knowne a Dog, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparison of *Beasts*, to *imitate* the *Speech* of *Man*, may be further enquired. Wee see that *Beasts* have those Parts, which they count the *Instruments* of *Speech*, (as *Lips*, *Teeth*, &c.) liker unto *Men*, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many *Beasts* have it, for the Length, as much as *Birds*. What better *Gorge*, or Artire, *Birds* have, may be further enquired. The *Birds* that are knowne to be Speakers, are, *Parrats*, *Pyes*, *Iayes*, *Dawes*, and *Ravens*. Of which *Parrots* have an adunque Bill, but the rest not.

But I conceive, that the *Aptnesse* of *Birds*, is not so much in the *Conformitie* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* must come by *Hearing*, and *Learning*; And *Birds* give more heed, and marke *Sounds*, more than *Beasts*; Because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keepe them Waking, to increase their *Attention*. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are ever the better *Singers*; which may be, because they are more lively, and listen more. 239

Labour, and *Intention* to *imitate voices*, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the voices of *Players* of *Enterludes*, so to life, as if you see them not, you would thinke they were those *Players* themselves; And so the *Voices* of other *Men* that they heare. 240

There have beene some, that could counterfeit the *Distance* of *Voices*, (which is a *Secondary Object* of *Hearing*,) in such sort; As when they stand fast by you, you would thinke the *Speech* came from a farre off, in a fearefull manner. How this is done, may be further enquired. But I see no great use of it, but for Imposture, in counterfeiting Ghosts or Spirits. 241

Experiments in Consort, touching the *Reflexion* of *Sounds*.

There be three Kindes of *Reflexions* of *Sounds*, A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, whereof the first hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speake of.

242 The *Reflexion* of *Species Visible*, by *Mirrours*, you may command; Because passing in Right Lines, they may be guided to any Point: But the *Reflexion* of *Sounds* is hard to master; Because the *Sound* filling great Spaces in Arched Lines, cannot be so guided: And therefore we see there hath not beene practised, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already knowne returneth in a very narrow Roome

243 The *Naturall Eccho's* are made upon *Walls*, *Woods*, *Rockes*, *Hills*, and *Banckes*; As for *Waters*, being neare, they make a *Concurrent Eccho*; But

being further off, (as upon a large *River*) they make an *Iterant Eccho*: For there is no difference between the *Concurrent Eccho*, and the *Iterant*, but the Quickneſſe, or Slowneſſe of the Returne. But there is no doubt, but *Water* doth helpe the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244 It is certaine, (as hath beene formerly touched,) that if you ſpeake thorow a *Trunke*, ſtopped at the further end, you ſhall finde a Blaſt returne upon your Mouth, but no *Sound* at all. The *Cauſe* is, for that the *Cloſeneſſe*, which preſerveth the *Originall*, is not able to preſerve the *Reflected Sound*: Beſides that *Eccho's* are ſeldom created, but by loud *Sounds*. And therfore there is leſſe hope of *Artificiall Eccho's* in Aire, pent in a narrow Concave. Nevertheleſſe it hath beene tried, that One leaning over a *Well*, of 25. Fathome deepe, and ſpeaking, though but ſoftly, (yet not ſo ſoft as a whiſper,) the *water* returned a good *Audible Eccho*. It would be tried, whether Speaking in *Caves*, where there is no Iſſue, ſave where you ſpeake, will not yeeld *Eccho's*, as *Wells* doe.

245 The *Eccho* commeth as the *Originall Sound doth*, in a Round Orbe of Aire: It were good to try the Creating of the *Eccho*, where the Body Repercuſſing maketh an Angle: As againſt the Returne of a Wall, &c. Alſo we ſee that in *Mirrours*, there is the like Angle of Incidence, from the Object to the Glaſſe, and from the Glaſſe to the Eye. And if you ſtrike a *Ball* ſide-long, not full upon the Surface, the Rebound will be as much the contrary way; Whether there bee any ſuch *Reſilience* in *Eccho's*, (that is, whether a Man ſhall heare better, if he ſtand aſide the Body Repercuſſing, than if he ſtand where he ſpeaketh, or any where in a right Line betweene;) may be tried. Triall likewiſe would be made, by Standing nearer the Place of Repercuſſing, than he that ſpeaketh; And againe by Standing further off, than hee that ſpeaketh; And ſo knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not ſtrongeſt neare hand.

246 There be many Places, where you ſhall heare a number of *Eccho's*, one after another: And it is, when there is Variety of *Hills*, or *Woods*, ſome nearer, ſome further off: So that the Returne from the further, being laſt created, will be likewiſe laſt heard.

247 As the *Voice* goeth round, as well towards the Backe, as towards the Front of him that ſpeaketh; So likewiſe doth the *Eccho*; For you have many Back-*Eccho's* to the Place where you ſtand.

248 To make an *Eccho*, that will report, three, or foure, or five Words, diſtinctly, it it requiſite, that the *Body Repercuſſing*, be a good diſtance off: For if it be neare, and yet not ſo neare, as to make a *Concurrent Eccho*, it choppeth with you upon the ſudden. It is requiſite likewiſe, that the *Aire* be not much *pent*. For *Aire*, at a great diſtance, *pent*, worketh the ſame effect with *Aire*, *at large*, in a ſmall diſtance. And therefore in the *Triall* of *Speaking* in the *well*, though the *well* was deepe, the *Voice* came backe, ſuddenly; And would beare the Report but of two Words.

For

For *Eccho's* upon *Eccho's*, there is a rare Inſtance thereof in a Place, which I will now exactly deſcribe. It is ſome three or foure Miles from *Paris*, neere a Towne called *Pont-Charenton*; And ſome Bird-bolt ſhot, or more, from the River of *Seane*. The Roome is a *Chappell*, or ſmall *Church*. The Walls all ſtanding, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Iſles of *Churches*, alſo ſtanding; The Roofe all open, not ſo much as any Embowment neere any of the walls left. There was againſt every Pillar, a Stacke of Billets, above a Mans Height; which the Watermen, that bring Wood downe the *Seane*, in Stacks, and not in Boats, laid there (as it ſeemeth) for their eaſe. Speaking at the one End, I did heare it returne the Voice thirteene ſeverall times; And I have heard of others, that it would returne ſixteene times: For I was there about three of the Clocke in the afternoone: And it is beſt, (as all other *Eccho's* are) in the Evening. It is manifeſt, that it is not *Eccho's* from ſeverall places, but a *Toſſing* of the *Voice*, as a Ball, to and fro; Like to *Reflexions* in *Looking-glaſſes*; where if you place one *Glaſſe* before, and another behinde, you ſhall ſee the *Glaſſe* behinde with the *Image*, within the *Glaſſe* before; And againe, the *Glaſſe* before in that; and divers ſuch *Super-Reflexions*, till the *ſpecies ſpeciei* at laſt die. For it is every Returne weaker, and more ſhady. In like manner, the *Voice* in that *Chappell*, createth *ſpeciem ſpeciei*, and maketh ſucceeding *Super-Reflexions*; For it melteth by degrees, and every *Reflexion* is weaker than the former: So that, if you ſpeake three Words, it will (perhaps) ſome three times report you the whole three Words; And then the two latter Words for ſome times; And then the laſt Word alone for ſome times; Still fading, and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or five Words; In this *Eccho* of ſo many Returnes, upon the matter, you heare above twenty Words, for three.

249

250 The like *Eccho* upon *Eccho*, but only with two Reports, hath beene obſerved to be, if you ſtand betweene a *Houſe*, and a *Hill*, and lure towards the *Hill*. For the *Houſe* will give a *Backe-Eccho*; One taking it from the other, and the latter the weaker.

251 There are certaine *Letters*, that an *Eccho* will hardly expreſſe; As *S*, for one; Eſpecially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Pariſian*, that tooke it to be the Worke of Spirits, and of good Spirits. For, (ſaid he) call *Satan*, and the *Eccho* will not deliver backe the Devils name; But will ſay, *Va'en*; Which is as much in *French*, as *Apage*, or *Avoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hiſſing and an *Interiour Sound*.

252 *Eccho's* are ſome more ſudden, and chop againe, as ſoone as the *Voice* is delivered; As hath beene partly ſaid: Others are more deliberate, that is, give more Space betweene the *Voice*, and the *Eccho*; which is cauſed by the locall Neareneſſe, or Diſtance: Some will report a longer Traine of Words; And ſome a ſhorter: Some more loud (full as loud as the *Originall*,

ginall, and sometimes more loud;) And some weaker and fainter.

253 Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*, and so make the Report greater, and even a *Continued Eccho*; which you shall find in some *Hills*, that stand encompassed, Theater-like.

254 It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe through divers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliver the *Sound*, in a differing Place, from that unto which it is deferred; which is the Proper Effect of *Refraction*. But *Majoration* which is also the Worke of *Refraction*, appeareth plainly in *Sounds*, (as hath beene handled at full;) But it is not by Diversitie of *Mediums*.

Experiments in Consort, touching the *Consent* and *Dissent* between *Visibles* and *Audibles*.

Wee have *obiter*, for Demonstrations sake, used in divers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But we thinke good now to prosecute that *Comparison* more fully.

CONSENT OF VISIBLES, and Audibles.

255 *Both* of them *spread themselves in Round*, and fill a whole Floare or Orbe, unto certaine Limits: And are carried a great way: And doe languish and lessen by degrees, according to the Distance of the Objects from the Sensories.

256 *Both* of them have the whole *Species in every small Portion of the Aire*, or *Medium*, So as the *Species* doe passe through small Crannies, without Confusion: As we see ordinarily in *Levels*, as to the *Eye*; And in *Crannies*, or *Chinks*, as to the *Sound*.

257 *Both* of them are of a *sudden and easie Generation* and *Delation*; And likewise *perish swiftly*, and *suddenly*; As if you remove the *Light*; Or touch the *Bodies* that give the *Sound*.

258 *Both* of them doe *receive* and *carry exquisite* and *accurate Differences*; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quaverings, in *Audibles*.

259 *Both* of them in their Vertue and Working, do not appeare to *emit any Corporall Substance* into their *Mediums*, or the Orbe of their Vertue; Neither againe to raise or stirre any *evident locall Motion* in their *Mediums*, as they passe; But only to carry certaine *Spirituall Species*; The perfect knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

260 *Both* of them seeme not to *generate* or *produce* any other *Effect in Nature*,

ture, but such as appertaineth to their proper Objects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The First, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sunne, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an *Object of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent *Sound* (neare the Eare) the Hearing: The Third, in that *both of them will be reverberate*; As in *Mirrours*; And in *Eccho's*. 261

Neither of them doth *destroy or hinder the Species of the other*, although they *encounter* in the same *Medium*; As Light or Colour hinder not *Sound*; Nor *è contrà*. 262

Both of them *affect the Sense in Living Creatures*, and yeeld *Objects of Pleasure and Dislike*: Yet nevertheless, the *Objects* of them doe also (if it be well observed) affect and worke upon dead Things; Namely, such as have some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke upon a *Looking-glasse*, which is like the Pupill of the Eye; And *Audibles* upon the Places of *Eccho*, which resemble, in some sort, the Caverne and structure of the Eare. 263

Both of them doe *diversly worke, as they have their Medium diversly disposed*. So a Trembling *Medium* (as Smoake) maketh the Object seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall. 264

To *Both*, the *Medium*, which is the most Propitious and Conducible, is *Aire*; For Glasse or Water, &c. are not comparable. 265

In *Both* of them, where the *Object is Fine and Accurate*, it conduceth much to have the *Sense Intentive*, *and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentively; which in Beasts that have Eares moveable, is most manifest. 266

The *Beames* of *Light*, when they are *multiplied*, and *conglomerate*, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication* and *Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*; which is an Action materiate, differing from the Action of *Sound*; If it bee true (which is anciently reported) that *Birds*, with great shouts, have fallen downe. 267

DISSENTS OF VISIBLES, and Audibles.

268 THe *Species* of *Visibles* seeme to bee *Emissions* of *Beames* from the *Object seene*; Almost like Odours; save that they are more Incorporeall: But the *Species* of *Audibles* seeme to Participate more with *Local Motion*, like *Percussions*, or *Impressions* made upon the *Aire*. So that whereas all Bodies doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *Species* of *Audibles* seeme to bee carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceive) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

270 There is one *Difference*, above all others, betweene *Visibles* and *Audibles*, that is the most remarkable; as that wherupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are *carried in Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of Bodies doth not much hinder the Sight, so that the Bodies be cleare, and the Pores in a Right Line, as in Glasse, Chrystall, Diamonds, Water, &c. But a thin Scarfe, or Handkerchiefe, though they be Bodies nothing so solide, hinder the Sight: Whereas (contrariwise) these Porous Bodies doe not much hinder the Hearing, but solide Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small Glasses suffice; but to the *Reverberation* of *Audibles*, are required greater Spaces, as hath likewise beene said before.

271 *Visibles* are seene further off, than *Sounds* are heard; Allowing nevertheless the *Rate* of their *Bigenesse*: For otherwise a *great Sound* will be heard further off, than a *Small Body* seene.

272 *Visibles* require (generally) some *Distance* betweene the *Object*, and the *Eye*, to bee better seene; Wheras in *Audibles*, the nearer the Approch of the *Sound* is to the Sense, the better. But in this there may be a double Errour. The one, because to *Seeing*, there is required *Light*; And any thing that toucheth the Pupill of the Eye (all over,) excludeth the *Light*. For I have heard of a Person very credible, (who himselfe was cured of a Cataract in one of his Eyes,) that while the Silver Needle did worke upon the Sight of his Eye, to remove the Filme of the Cataract,

ract, he never saw any thing more cleare or perfect, than that white Needle: Which (no doubt,) was, because the Needle was lesser than the *Pupill* of the *Eye*, and so tooke not the Light from it. The other Errour may be, for that the *Object* of *Sight* doth strike upon the *Pupill* of the *Eye*, directly without any interception; whereas the *Cave* of the *Eare* doth hold off the *Sound* a little from the Organ: And so nevertheless there is some *Distance* required in both.

Visibles are swiftlier carried to the *Sense*, than *Audibles*; As appeareth in Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which have beene set downe heretofore, but are proper for this *Title*. 273

I conceive also, that the *Species* of *Audibles* doe hang longer in the Aire, than those of *Visibles*: For although even those of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* fillipped; A *Fire-brand* caried along, which leaveth a Traine of Light behinde it; and in the *Twilight*; And the like: Yet I conceive that *Sounds* stay longer, because they are carried up and downe with the Winde: And because of the Distance of the Time, in *Ordnance discharged*, and *heard* twenty Miles off. 274

In *Visibles*, there are not found Objects so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate Objects. And therefore in *Pictures*, those foule Sights doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the Eare doth straight-wayes refuse. 275

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring light*, the Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after *a deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neare the *Cataracts* of *Nilus*, are strucken deafe: But we finde no such effect, in Cannoniers, nor Millers, nor those that dwell upon Bridges. 276

It seemeth that the *Impression* of *Colour* is so weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Basis is in the Object, and the Verticall Point in the Eye; So as there is a Corradiation and Conjunction of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speake not. For the *Beames* passe, and give little Tincture to that Aire, which is Adjacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body* of *Light*. For when there is a Skreene between the Candle and the Eye, yet the *Light* passeth to the Paper whereon One writeth; So that the *Light* is seene, where the Body of the *Flame* is not seene; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not be seene. I judge that *Sound* is of this Latter Nature. 277

ture: For when two are placed on both ſides of a Wall, and the Voice is heard, I judge it is not onely the *Originall Sound*, which paſſeth in an *Arched Line*; But the *Sound*, which paſſeth above the Wall in a Right Line, begetteth the like Motion round about it, as the firſt did, though more weake.

Experiments in Conſort, touching the *Sympathy* or *Antipathy* of *Sounds*, one with another.

278 ALL *Concords* and *Diſcords* of *Muſicke*, are (no doubt) *Sympathies*, and *Antipathies* of *Sounds*. And ſo (likewiſe) in that *Muſicke*, which we call *Broken Muſicke*, or *Conſort Muſicke*; Some *Conſorts* of *Inſtruments* are ſweeter than others; (A Thing not ſufficiently yet obſerved:) As the *Iriſh Harpe*, and *Baſe Viall* agree well: The *Recorder* and *Stringed Muſicke* agree well: *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welch-Harpe*, and *Iriſh-Harpe*; Or the *Voice* and *Pipes* alone, agree not ſo well; But for the *Melioration* of *Muſicke*, there is yet much left (in this Point of *Exquiſite Conſorts*) to try and enquire.

279 There is a Common Obſervation, that if a *Lute*, or *Viall*, be layed upon the Backe, with a ſmall Straw upon one of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute*, or *Viall*, the *Vniſon* to that *String* be ſtrucken; it will make the *String* move; Which will appeare both to the Eye, and by the *Strawes* Falling off. The like will be, if the *Diapaſon* or *Eight* to that *String* be ſtrucken, either in the ſame *Lute*, or *Viall*, or in others lying by; But in none of theſe there is any Report of *Sound*, that can be diſcerned, but onely Motion.

280 It was deviſed, that a *Viall* ſhould have a Lay of Wire Strings below, as cloſe to the Belly, as a *Lute*; And then the *Strings* of Guts mounted upon a Bridge, as in Ordinary *Vialls*; To the end, that by this means, the upper *Strings* ſtrucken, ſhould make the lower reſound by *Sympathy*, and ſo make the *Muſicke* the better; Which, if it be to purpoſe, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this device I conceive to be of no uſe; becauſe the upper *Strings*, which are ſtopped in great variety, cannot maintaine a *Diapaſon* or *Vniſon*, with the Lower, which are never ſtopped. But if it ſhould be of uſe at all; it muſt be in *Inſtruments* which have no Stops; as *Virginalls*, and *Harpes*; wherein triall may be made of two Rowes of Strings, diſtant the one from the other.

281 The *Experiment* of *Sympathy* may be transferred (perhaps) from *Inſtruments* of *Strings*, to other *Inſtruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Vniſon*, whether the ſtriking of the one would move the other, more than if it were another Accord: And ſo in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would move in the one *Pipe*, when the other is blowne at an *Vniſon*.

282 It ſeemeth, both in *Eare*, and *Eye*, the *Inſtrument* of *Sense*, hath a *Sympathy* or Similitude with that which giveth the *Reflexion*. (As hath beene touched before.) For as the *Sight* of the *Eye* is like a Cryſtall, or Glaſſe, or Water; So is the *Eare* a ſinuous Cave, with a hard Bone, to ſtop

ſtop and reverberate the *Sound*: Which is like to the Places that report *Eccho's*.

Experiments in Conſort, touching the *Hindring* or *Helping* of the *Hearing*.

283 WHen a Man *Yawneth*, he cannot *Heare* ſo well. The *Cauſe* is, for that the *Membrane* of the *Eare* is extended; And ſo rather caſteth off the *Sound*, than draweth it to.

284 We *Heare* better when we *hold our Breath*, than contrary; In ſo much as in all Liſtening to attaine a *Sound* a farre off, Men *hold their Breath*. The *Cauſe* is, For that in all *Expiration*, the Motion is Outwards; And therefore, rather driveth away the voice, than draweth it: And beſides we ſee, that in all *Labour* to doe things with any ſtrength, wee *hold the Breath*: And liſtening after any *Sound*, that is heard with difficultie, is a kinde of *Labour*.

285 Let it be tryed, for the *Helpe* of the *Hearing*, (and I conceive it likely to ſucceed,) to make an *Inſtrument* like a *Tunnell*; The narrow Part whereof may be of the Bigneſſe of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length halfe a foot, or more. And let the narrow End of it be ſet cloſe to the *Eare*: And marke whether any *Sound*, abroad in the open Aire, will not be heard diſtinctly, from further diſtance, than without that Inſtrument; being (as it were) an *Eare-Spectacle*. And I have heard there is in *Spaine*, an *Inſtrument* in uſe to be ſet to the *Eare*, that *helpeth* ſomewhat thoſe that are Thicke of Hearing.

286 If the *Mouth* be ſhut cloſe, nevertheleſſe there is yeelded by the Roofe of the Mouth, a Murmur. Such as is uſed by dumbe Men: But if the *Noſtrills* be likewiſe ſtopped, no ſuch Murmur can be made; Except it be in the Bottome of the Pallate towards the Throat. Whereby it appeareth manifeſtly, that a *Sound* in the *Mouth*, except ſuch as aforeſaid, if the *Mouth* be ſtopped, paſſeth from the *Pallate*, thorow the *Noſtrills*.

Experiments in Conſort, touching the *Spirituall* and *Fine Nature* of *Sounds*.

287 THe *Repercuſſion* of *Sounds*, (which we call *Ecche*,) is a great Argument of the *Spirituall Eſſence* of *Sounds*. For if it were *Corporeall*, the Repercuſſion ſhould be created in the ſame manner, and by like *Inſtruments*, with the *Originall Sound*: But we ſee what a Number of *Exquiſite Inſtruments* muſt concurre in Speaking of Words, whereof there is no ſuch Matter in the Returning of them; But onely a plaine Stop, and *Repercuſſion*.

288 The Exquiſite *Differences* of *Articulate Sounds*, carried along in the *Aire*, ſhew that they cannot be *Signatures* or *Impreſſions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Seales make excellent Impreſſions: And ſo it may be thought of *Sounds* in their firſt Generation: But then the *Delation* and *Continuance* of them without any new Sealing, ſhew apparently they cannot be Impreſſions.

289 All *Sounds* are ſuddenly made, and doe ſuddenly periſh; But neither that, nor the *Exquiſite Differences* of them, is Matter of ſo great Admiration: For the Quaverings, and Warblings in Lutes, and Pipes,

are

are as ſwift; And the Tongue, (which is no very fine Inſtrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are uttered. But that *Sounds* ſhould not onely be ſo ſpeedily generated, but carried ſo farre every way, in ſuch a momentany time, deſerveth more Admiration. As for Example; If a Man ſtand in the middle of a Field, and ſpeake aloud, he ſhall be heard a Furlong in round; And that ſhall be in *Articulate Sounds*; And thoſe ſhall be Entire in every little Portion of the Aire; And this ſhall be done in the Space of leſſe than a Minute.

290 The *Sudden Generation* and *Periſhing* of *Sounds*, muſt be one of theſe two Wayes. Either that the *Aire* ſuffereth ſome Force by *Sound*, and then reſtoreth it ſelfe; As Water doth; Which being divided, maketh many Circles, till it reſtore it ſelfe to the naturall Conſiſtence: Or otherwiſe, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; For that the *Aire* hath (as it ſhould ſeeme) a ſecret and hidden Appetite of Receiving the *Sound* at the firſt; But then other Groſſe and more Materiate Qualities of the Aire ſtraight-wayes ſuffocate it; Like unto *Flame*, which is generated with Alacritie, but ſtraight quenched by the Enmitie of the *Aire*, or other Ambient Bodies.

There be theſe *Differences* (in generall) by which *Sounds* are divided; 1. *Muſicall, Immuſicall*; 2. *Treble, Baſe*; 3. *Flat, Sharpe*; 4. *Soft, Loud*; 5. *Exteriour, Interiour*; 6. *Cleane, Harſh* or *Purling*; 7. *Articulate, Inarticulate*.

We have laboured (as may appeare,) in this *Inquiſition* of *Sounds*, diligently; Both becauſe *Sound* is one of the moſt Hidden Portions of *Nature*, (as we ſaid in the beginning:) And becauſe it is a *Vertue* which may be called *Incorporeall*, and *Immateriate*; whereof there be in *Nature* but few. Beſides, we were willing, (now in theſe our firſt *Centuries*,) to make a Patterne or Preſident of an *Exact Inquiſition*; And we ſhall doe the like hereafter in ſome other Subjects which require it. For wee deſire that Men ſhould learne and perceive, how ſevere a Thing the true *Inquiſition* of *Nature* is; And ſhould accuſtome themſelves, by the light of Particulars, to enlarge their Mindes, to the Amplitude of the World; And not reduce the World to the Narrowneſſe of their Mindes.

Experiment Solitary touching the *Originall Colours*, in *diſſolution* of *Metalls*.

291 *Metalls* give *Orient* and *Fine Colours* in *Diſſolutions*; As *Gold* giveth an excellent Yellow; *Quick-Silver* an excellent Greene; *Tinne* giveth

giveth an excellent Azure: Likewiſe in their *Putrefactions*, or *Ruſts*; As *Vermilion, Verdegreaſe, Biſe, Cirrus*, &c. And likewiſe in their *Vitrifications*. The *Cauſe* is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Poſture; And againe to retaine Part of their principall Spirit; Which two Things, (Equall Poſture, and Quicke Spirits) are required chiefely, to make *Colours* lightſome.

Experiment Solitary touching *Prolongation* of *Life*.

292 IT conduceth unto *Long life*, and to the more Placide Motion of the Spirits, which thereby doe leſſe prey and conſume the Juyce of the Body; Either that *Mens Actions be free and voluntary*; That nothing be done *Invitâ Minervâ*, but *Secundum Genium*: Or on the other ſide, that the *Actions* of *Men be full of Regulation, and Commands within themſelves*: For then the Victory and Performing of the Command, giveth a good Diſpoſition to the Spirits; Eſpecially if there be a Proceeding from Degree to Degree; For then the Senſe of Victory is the greater. An example of the former of theſe, is in a Countrey life; And of the latter, in *Monkes* and *Philoſophers*, and ſuch as doe continually enjoyne themſelves.

Experiment Solitary touching *Appetite of Vnion* in *Bodies*.

293 IT is certaine, that in all Bodies, there is an *Appetite* of *Vnion*, and Evitation of Solution of Continuitie: And of this *Appetite* there be many *Degrees*; But the moſt Remarkable, and fit to be diſtinguiſhed, are three. The firſt in *Liquours*; The ſecond in *Hard Bodies*: And the third in *Bodies Cleaving* or *Tenacious*. In *Liquours*, this *Appetite* is weake: Wee ſee in *Liquours*, the *Thredding* of them in *Stillicides*, (as hath beene ſaid;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles and Froth*. In the ſecond *Degree* or *Kinde*, this *Appetite* is ſtrong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For ſuch *Bodies* doe partly follow the Touch of another Body; And partly ſticke and continue to themſelves; And therefore they roape, and draw themſelves in Threds; As wee ſee in *Pitch, Glew, Birdlime*, &c. But note, that all *Solide Bodies* are *Cleaving*, more or leſſe: And that they love better the Touch of ſomewhat that is *Tangible*, than of *Aire*. For *Water*, in ſmall quantitie, cleaveth to any Thing that is Solide; And ſo would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaveth: But thoſe *Bodies* which are noted to be Clammy, and Cleaving, are ſuch, as have a more indifferent *Appetite* (at once,) to follow another *Body*; And to hold to themſelves. And therefore they are commonly *Bodies* ill mixed; And which take more pleaſure in a Forraine Body, than in perſerving their owne *Conſiſtence*; And which have little

tle predominance in *Drought*, or *Moisture*.

Experiment Solitary touching the like Operations of Heat, and Time. 294

Time, and *Heat*, are Fellowes in many Effects. *Heat* drieth Bodies, that doe easily expire; As Parchment, Leaves, Roots, Clay, &c. And, so doth *Time* or *Age* arefie; As in the same Bodies, &c. *Heat* dissolveth and melteth Bodies, that keepe in their Spirits; As in divers *Liquefactions*; And so doth *Time*, in some Bodies of a softer Consistence: As is manifest in Honey, which by *Age* waxeth more liquid; And the like in Sugar; And so in old Oyle, which is ever more cleare, and more hot in Medicinable use. *Heat* causeth the Spirits to search some Issue out of the Body; As in the *Volatilitie* of *Metalls*; And so doth *Time*; As in the *Rust* of *Metalls*. But generally *Heat* doth that in small time, which *Age* doth in long.

Experiment Solitary touching the differing Operations of Fire, and Time. 295

Some Things which passe the *Fire* are softest at first, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards give againe, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The *Cause* is, for that in those things which waxe Hard with *Time*, the Worke of the *Fire* is a Kinde of *Melting*: And in those that waxe Soft with *Time*, (contrariwise,) the worke of the *Fire* is a Kinde of *Baking*; And whatsoever the *Fire* baketh, *Time* doth in some degree dissolve.

Experiment Solitary touching *Motions* by *Imitation*. 296

Motions passe from one Man to another, not so much by Exciting Imagination; as by Invitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heavie, by any Vapour, or the like. For then they strive, (as it were,) to wring out, and expell that which loadeth them. So Men drowzie, and desirous to sleepe: Or before the Fit of an Ague; doe use to Yawne and Stretch; And doe likewise yeeld a *Voice* or *Sound*, which is an *Interjection* of *Expulsion*: So that if another be apt and prepared to doe the like, hee followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment Solitary, touching *Infectious Diseases*. 297

There be some knowne *Diseases* that are *Infectious*; And Others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Body to Body: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as *Taint* the *Breath*; Which wee see passeth manifestly from Man to Man; And not invisible, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adjacent*.

Adjacent; Especially if they consist in an Vnctuous Substance, not apt to dissipate; Such are *Scabs*, and *Leprasie*. Fourthly, such as are meerely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they never infect, but by *Touch* onely; And such a *Touch*, also as commeth within the *Epidermis*; As the Venome of the *French Pox*; And the *Biting* of a *Mad Dog*.

Experiment Solitary touching the *Incorporation* of *Powders* and *Liquours*. 298

Most *Powders* grow more Close and Coherent by *Mixture* of *Water*, than by *Mixture* of *Oyle*; though *Oyle* bee the thicker Body; As *Meale*; &c. The Reason is, the Congruity of Bodies; which if it bee more, maketh a Perfecter Imbibition, and Incorporation; Which in most *Powders* is more betweene *Them* and *Water*, than betweene *Them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiment Solitary touching *Exercise* of the *Body*. 299

Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for others. If the Body be Hot, & Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much upon *Exercise*. Likewise Men ought to beware, that they use not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that it helpeth to Excerne by *Sweat*, and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Evills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it bee much, is no Friend to *Prolongation* of *Life*; Which is one Cause, why *women* live longer than *Men*, because they stirre lesse.

Experiment Solitary, touching *Meats*, that *induce Satiety*. 300

Some *Food* we may use *long*, and *much*, without *Glutting*; As Bread, Flesh that is not fat, or rancke, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The *Cause* is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the Stomacke; Or possessing it with somewhat that is Astringent; And therfore Cold and Dry. But things that are *Sweet* and *Fat*, are more Filling: And doe swimme and hang more about the Mouth of the Stomacke; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and ever abateth the Appetite. Wee see also, that another *Cause* of *Satiety*, is an *Over-Custome*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To give the Reason of the *Distaste* of *Satiety*, and of the *Pleasure*

sure in *Newsly*; and to distinguish not onely in Meats and Drinkes, but also in Motions, Loves, Company, Delights, Studies, what they be that *Custome* make them more grateful; And what more tedious; were a large Field. But for *Meats*, the Cause is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a Reliſh by former uſe. And (generally) it is a Rule, that whatſoever is ſomewhat Ingrate at firſt, is made Grateſull by *Caſtome*; But whatſoever is too Pleaſing at firſt, groweth quickly to ſatiate.

NATV-

NATVRALL HISTORIE.

IV. Century.

ACCELERATION of *Time*, in *Works* of *Nature*, may well be eſteemed *Inter Magnalia Naturæ*. And even in *Divine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. Wee will now therefore proceed to the Enquiry of it: And for *Acceleration* of *Germination*, we will referre it over unto the place, where we ſhall handle the Subject of *Plants*, generally; And will now begin with other *Accelerations*.

Experiments in Conſort, touching the *Clarification* of *Liquours*, and the *Accelerating* thereof.

Liquours are (many of them,) at the firſt, thicke and troubled; As *Muſt*, *Wort*, *Iuyces* of *Fruits*, or *Heerbs* expreſſed, &c. And by *Time* they ſettle, and Clarifie. But to make them cleare, before the *Time*, is a great Worke; For it is a Spurre to Nature, and putteth her out of her pace: And beſides, it is of good uſe, for making *Drinkes*, and *Sauces*, Potable, and Serviceable, ſpedily; But to know the *Meanes* of *Accelerating Clarification*, we muſt firſt know the *Cauſes* of *Clarification*. The firſt *Cauſe* is, by the *Seperation* of the *Groſſer Parts* of the *Liquour*, from the *Finer*. The ſecond, by the *Equall Diſtribution* of the *Spirits* of the *Liquour*, with the *Tangible Parts*: For that ever repreſenteth Bodies Cleare and Vntroubled. 301

bled. The third, by the *Refining* the *Spirit it selfe*, which thereby giveth to the *Liquour* more Splendour, and more Lustre.

302 First, for *Separation*; It is wrought by *weight*; As in the ordinary Residence or Settlement of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the severall Parts, either up, or downe, which is a kinde of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*, which Viscous Body (afterwards severed) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*.

303 Secondly, for the *Even Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we speak not, because it is that, we would anticipate and represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better passe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise By *Heat*; By *Motion*; And By *Mixture* of some *Body* which hath *Vertue to attenuate*. So therefore (having shewen the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trialls*.

305 It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which wee call *Racking*;) wherby it will *Clarifie* much the sooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it lasting; yet withall they cast up some Spissitude: And this *Instance* is to be referred to *Separation*.

306 One the other side, it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessell from the *Lees*, and powre the *Lees* of the Racked Vessell into the unracked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in some Quantitie of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, wherby they may fall downe into *Lees*. And this *Instance* againe is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are Infused in *Liquour*, the more thicke and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*, the clearer it is. The reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or settleth at the Bottome. And therefore the most Exact Way to *Clarifie* is; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Malt* first Infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost

almost to the very Neck: Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* every day, by the space of Ten Dayes; and then compare it with another Bottle of the same *Beere* set by. Take also Lime both *Quenched*, and *Vnquenched*, and set the Bottles in them, *ut suprà*. This *Instance* is refered, both to the *Even Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

310 Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheele-Barrow*, upon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leave some Aire; For if the *Liquour* come close to the Stopple, it cannot play, nor flower: And when you have shaken them well, either way, poure the *Drinke* into another Bottle, stopped close, after the usuall manner; For if it stay with much Aire in it, the *Drinke* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24. houres: Then take it, and and put it againe into a *Bottle* with *Aire*, *ut suprà*: And thence into a *Bottle Stopped ut suprà*: And so repeat the same *Operation* for seven dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to trie it in a *Bottle* with a little Aire below the Neck, without Emptying. This *Instance* is referred to the *Even Distribution* and *Refining* of the *Spirits* by *Motion*.

311 As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*,) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New-Beere*, and stirred with it: For it may be that the Grosser Part of the *Beere* will cleave to the *Milke*: The Doubt is, whether the *Milke* will sever well againe; Which is soone tried. And it is usuall in *Clarifying Ippocrasse* to put in *Milke*; Which after severeth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they use to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be.

Experiments in Consort touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickning* of *Drinks*. And next touching the *Maturation* of *Fruits*.

The *Accelerating* of *Maturation* wee will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes*, and *Vlcers*. This last we referre to another Place, where wee shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metalls*, &c. whereof wee will speake as Occasion serveth. But we will begin with that of *Drinkes*, because it hath such Affinitie with the *Clarification* of *Liquours*.

312 For the *Maturation* of *Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the Grosser Parts: And it is effected partly, by the same means, that *Clarification* is, (whereof wee spake before;) But then note, that an Extreme *Clarification* doth

spread the *Spirits* so Smooth, as they become Dull, & the *Drinke* dead, which ought to have a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

313 We see the *Degrees* of *Maturation* of *Drinkes*; In *Must*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well Congregated; *Wine* hath them well united; so as they make the Parts somewhat more Oylie: *Vinegar* hath them Congregated, but more Jejune, and in smaller Quantitie; The greatest and finest Spirit and Part being exhaled: For we see *Vinegar* is made by setting the Vessell of *Wine* against the hot Sun: And therefore *Vinegar* will not burne; For that much of the Finer Parts is Exhaled.

314 The *Refreshing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirits*: So wee see that *Open Weather* relaxeth the *Spirit*, and maketh it more lively in *Motion*. Wee see also *Bottling* of *Beere*, or *Ale*, while it is New, and full of *Spirit*, (so that it spirteth when the Stopple is taken forth) maketh the *Drinke* more quicke and windie. A *Pan* of *Coales* in the *Cellar* doth likewise good, and maketh the *Drinke* worke againe. *New Drinke*, put to *Drinke* that is *Dead*, provoketh it to worke againe: Nay, which is more, (as some affirme,) *A Brewing of New Beere*, set by *Old Beere*, maketh it worke againe. It were good also to *Enforce* the *Spirits* by some *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We see *Creame* is *Matured*, and made to rise more speedily, by Putting in *Cold Water*; which, as it seemeth, getteth downe the *Whey*.

315 It is tried, that the *Burying* of *Bottles of Drinke* well stopped, either in *drie Earth*, a good depth; Or in the *Bottome* of a *well within Water*; And best of all the *Hanging* of them in a *deepe Well* somewhat *above the water*, for some fortnights space, is an Excellent *Meanes* of making *Drinke* fresh, and quicke: for the *Cold* doth not cause any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the rest that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they incorporate the Parts of the *Liquour* perfectly.

316 As for the *Maturation of Fruits*; It is wrought by the *Calling forth of the Spirits of the Body outward*, and so *Spreading* them more *smoothly*: And likewise by *Digesting*, in some degree, *the Grosser Parts*: And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment* of *Putrefaction*: For the Inception of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Covered over with *Onions*; Covered over with *Crabs*; Closed up in *Wax*; Shut in a *Box*: &c. There was also an *Apple* hanged up in *Smoake*: Of all which the *Experiment* sorted in this Manner.

318 After a Moneths Space, the *Apple* Enclosed in *Wax*, was as Greene and Fresh as at the first Putting in, and the *Kernells* continued White. The *Cause* is, for that all *Exclusion* of *Open Aire*, (which is ever Predatory) maintaineth the Body in his first Freshnesse, and Moisture: But the Inconvenience

convenience is, that it tasteth a little of the *Wax*: Which, I suppose, in a *Pomgranate*, or some such thick-coated *Fruit*, it would not doe.

319 The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Drie, Soft, Sweet, Yellow within. The *Cause* is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (For we see that in a greater *Heat*, a *Roast Apple* Softneth and Melteth, And *Pigs-feet*, made of Quarters of *Wardens*, scorch and have a Skinne of Cole) doth Mellow, and not Adure: The *Smoake* also maketh the *Apple* (as it were) sprinkled with *Soot*, which helpeth to *Mature*. We see that in *Drying* of *Peares*, and *Prunes*, in the Oven, and Removing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intense degree of *Heat*.

320 The *Apples* covered in the *Lime* and *Ashes*, were well *Matured*; As appeared both in their Yellownesse, and Sweetnesse. The *Cause* is, for that that *Degree of Heat* which is in *Lime*, and *Ashes*, (being a Smoothering *Heat*) is of all the rest most Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the Taste of those *Apples* was good; And therefore it is the *Experiment* fittest for Use.

321 The *Apples*, *Covered* with *Crabs*, and *Onions*, were likewise well *Matured*. The Cause is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*; which taketh away Hardnesse. So we see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first upon a heape. So one *Cluster* of *Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botrum citiùs matureſcit.*

322 The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not so much as the Other; But the *Apple* in the *Straw* more. The *Cause* is, for that the *Hay* and *Straw* have a very low degree of *Heat*, but yet Close and Smoothering, and which drieth not.

323 The *Apple* in the *Close Box*, was ripened also: The *Cause* is, for that all Aire, kept close, hath a degree of *warmth*: As we see in *Wooll*, *Furre*, *Flush*, &c.

Note that all these were Compared with another Apple, *of the same kinde, that Lay of it selfe: And in Comparison of that, were more Sweet, and more Yellow, and so appeared to be more Ripe.*

324 Take an *Apple*, or *Peare*, or other like *Fruit*, and *Rowle* it upon a Table hard: Wee see in Common Experience, that the *Rowling* doth Soften and Sweeten the *Fruit* presently, Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts: For the *Unequall Distribution* of the *Spirits* maketh the Harrishnesse: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therefore, if you should *Rowle* them but gently, perhaps twice a day; And continue it some seven dayes, it is like they would *mature* more finely, and like unto the *Naturall Maturation*.

325 Take an *Apple*, and cut out a Peece of the Top, and cover it, to see whether that *Solution of Continuitie* will not hasten a *Maturation*: We see that

that where a *Wasp*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily.

326 Take an *Apple*, &c. and pricke it with a *Pinne* full of *Holes*, not deepe, and smeare it a little with *Sacke*, or *Cinnamon Water*, or *Spirit of Wine*, every day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these Trialls *also, as was used in the first, set another of the same* Fruits *by, to Compare them: And trie them, by their* Yellownesse, *and by their* Sweetnesse.

Experiment Solitary, touching the *Making* of *Gold*.

The World hath beene much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I judge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practice, full of Errour and Imposture; And in the Theory, full of unsound Imaginations. For to say, that *Nature* hath an Intention to make all Metals *Gold*; And that, if she were delivered from Impediments, she would performe her owne Worke; And that, if the Crudities, Impurities, and Leprosities of *Metals* were cured, they would become *Gold*; And that a little *Quantitie* of the *Medicine*, in the Worke of *Projection*, will turne a Sea of the *Baser Metall* into *Gold*, by *Multiplying*: All these are but dreames: And so are many other Grounds of *Alchymy*. And to helpe the Matter, the *Alchymists* call in likewise many Vanities, out of *Astrologie*; *Naturall Magicke*; Superstitious Interpretations of *Scriptures*; Auricular *Traditions*; Faigned Testimonies of *Ancient Authors*; And the like. It is true, on the other side, they have brought to light not a few profitable *Experiments*, and thereby made the World some amends. But wee, when wee shall come to handle the *Version* and *Transmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true Wayes and Passages of *Nature*, which may leade to this great Effect. And wee commend the wit of the *Chineses*, who despaire of Making of *Gold*, but are Mad upon the Making of *Silver*: For certain it is, that it is more difficult to make *Gold*, (which is the most Ponderous and Materiate amongst *Metalls*) of other *Metalls*, lesse Ponderous, and lesse Materiate; than (*viâ versâ*) to make *Silver* of *Lead*, or *Quick-Silver*; Both which are more Ponderous than *Silver*; So that they need

need rather a further Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturation*, wee will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby Turning some of them into *Gold*: For we conceive indeed, that a perfect good *Concoction*, or *Disgestion*, or *Maturation* of some *Metalls*, will produce *Gold*. And here we call to minde, that we knew a *Dutch-man*, that had wrought himselfe into the beleefe of a great Person, by undertaking that he could make *Gold*: Whose discourse was, that *Gold* might be made; But that the *Alchymists* Over-fired the Worke: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lamp, that should carry a Temperate and Equall Heat: And that it was the Worke of many Moneths. The Device of the Lampe was folly; But the Over-firing now used; And the Equall Heat to be required; And the Making it a Worke of some good Time; are no ill Discourses.

We resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The First is, that there be *used a Temperate Heat*; For they are ever *Temperate Heats* that *Disgest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subject*; For that may be *Temperate* to *Fruits*, and *Liquours*, which will not worke at all upon *Metalls*. The Second is, that the *Spirit of the Metall be quickened*, and the *Tangible Parts opened*: For without those two Operations, the *Spirit* of the *Metall*, wrought upon, will not be able to disgest the Parts. The Third is, that the *Spirits doe spread themselves Even*, and *move not Subsultorily*; For that will make the Parts Close, and Pliant. And this requireth a Heat, that doth not rise and fall, but continue as *Equall* as may be. The Fourth is, that *no Part of the Spirit be emitted, but detained*: For if there be *Emission* of *Spirit*, the Body of the *Metall* will be Hard, and Churlish. And this will be performed, partly by the Temper of the Fire; And partly by the closenesse of the Vessell. The

Fifth

Fifth is, that there be *Choice made of the likelieſt and beſt Prepared Metalls for the Verſion:* For that will facilitate the Worke. The Sixth is, that you give *Time enough for the Worke:* Not to prolong Hopes (as the Alchymiſts doe;) but indeed to give *Nature* a convenient Space to worke in. Theſe Principles are moſt certaine, and true; Wee will now derive a direction of *Triall* out of them; Which may (perhaps) by further Meditation, be improved.

327 Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be ſuch, as may keepe the *Metall perpetually Moulten*, and no more; For that above all importeth to the Worke. For the Materiall, take *Silver*, which is the *Metall* that in Nature Symbolizeth moſt with *Gold*; Put in alſo, with the *Silver*, a Tenth Part of *Quick-ſilver*, and a Twelfth Part of *Nitre*, by weight; Both theſe to quicken and open the Body of the *Metall:* And ſo let the Worke be continued by the *Space of Six Moneths*, at the leaſt. I wiſh alſo, that there be, at ſome times, an Injection of ſome *Oyled* Subſtance; Such as they uſe in the Recovering of *Gold*, which by Vexing with Separations hath beene made Churliſh: And this is, to lay the Parts more Cloſe and Smooth, which is the Maine Worke. For *Gold* (as we ſee) is the Cloſeſt (and therefore the Heavieſt) of *Metalls:* And is likewiſe the moſt Flexible, and Tenſible. Note, that to thinke to make *Gold* of *Quick-ſilver*, becauſe it is the heavieſt, is a Thing not to be hoped; For *Quick-ſilver* will not endure the Mannage of the *Fire*. Next to *Silver*, I thinke *Copper* were fitteſt to be the *Materiall*.

Experiment Solitary touching the *Nature* of *Gold*.

328 *Gold* hath theſe *Natures: Greatneſſe of Weight*; *Cloſeneſſe of Parts*; *Fixation*; *Pliantneſſe*, or *Softneſſe*; *Immunitie from Ruſt*; *Colour* or *Tincture of Yellow*. Therefore the Sure Way, (though moſt about,) to make *Gold*, is to know the *Cauſes* of the Severall *Natures* before rehearſed, and the *Axiomes* concerning the ſame. For if a Man can make a *Metall*, that hath all theſe *Properties*, Let Men diſpute, whether it be *Gold*, or no?

Experiments in Conſort touching the *Enducing* and *Accelerating* of *Putrefaction*.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Univerſall Enquiry: For *Corruption* is a Reciprocall to *Generation:* And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which ever are Unquiet to *Get forth*, and *Congregate* with the *Aire*, and to enjoy the *Sunbeames*. The *Getting forth*, or Spreading of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing *Operations*. If the

the *Spirits* be detained within the Body, and move more violently, there followeth *Colliquation*; As in *Metalls*; &c. If more Mildely, there followeth *Diſgeſtion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* be not meerely Detained, but Protrude a little, and that Motion be Confuſed, and Inordinate; there followeth *Putrefaction*; Which ever diſſolveth the Conſiſtence of the Body into much Inequalitie; As in *Fleſh*, *Rotten Fruits*, *Shining Wood*, &c. And alſo in the *Ruſt* of *Metalls*. But if that Motion be in a certaine Order, there followeth *Vivification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures Perfect*. But if the *Spirits* iſſue out of the Body, there followeth *Deſiccation*, *Induration*, *Conſumption*, &c. As in *Bricke*, evaporation of *Bodies Liquid*, &c.

329 The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; Firſt by *Adding ſome Crude or Watry Moiſture*; As in Wetting of any Fleſh, Fruit, Wood, with *Water*, &c. For contrariwiſe *Vnctuous* and *Oyly Subſtances* preſerve.

330 The Second is by *Invitation* or *Excitation*; As when a *Rotten Apple* ſweth cloſe to another *Apple* that is *Sound:* Or when *Dung* (which is a Subſtance already Putrified) is added to other Bodies. And this is alſo notably ſeene in *Church-yards*, where they bury much; Where the Earth will conſume the *Corps*, in farre ſhorter time, than other Earth will.

331 The Third is, by *Cloſeneſſe*, and *Stopping*, which *detaineth* the *Spirits*, *in Priſon*, more than they would; And thereby irritateth them to ſeeke Iſſue; As in Corne, and Cloaths, which wax Muſty; and therefore Open Aire (which they call *Aer perflabilis*) doth preſerve: And this doth appeare more Evidently in *Agues*, which come (moſt of them,) of *Obſtructions*, and *Penning* the *Humours*, which thereupon *Putrifie*.

332 The Fourth is, by *Solution of Continuitie*; As we ſee an Apple will rot ſooner, if it be Cut or Pierced; And ſo will Wood, &c. And ſo the Fleſh of Creatures alive, where they have received any Wound.

333 The Fifth is, either by the *Exhaling*, or by the *Driving back* of the *Principall Spirits*, which preſerve the Conſiſtence of the *Body*; So that when their Government is diſſolved, every *Part* returneth to his Nature, or Homogeny. And this appeareth in *Vrine*, and *Bloud*, when they coole, and thereby breake; It appeareth alſo in the *Gangrene*, or *Mortification* of *Fleſh*, either by *Opiates*, or by *Intenſe Colds*. I conceive alſo the ſame Effect is in *Peſtilences*, for that the *Malignitie* of the *Infecting Vapour*, daunceth the *Principall Spirits*, and maketh them flie, and leave their *Regiment*; And then the *Humours*, *Fleſh*, and *Secondary Spirits*, doe diſſolve, and breake, as in an *Anarchy*.

The

334 The Sixth is, when a *Forraine Spirit, Stronger and more Eager than the Spirits of the Body, entreth the Body*; As in the Stinging of Serpents. And this is the *Cause* (generally) that upon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the *Body* it selfe Congregate too much; As upon *Blowes*, and *Bruises*; Or when they are *Pent in too much*, as in *Swelling* upon *Cold*. And we see also, that the *Spirits*, comming of *Putrefaction* of *Humours* in *Agues*, &c. Which may be counted as *Forraine Spirits*, though they be bred within the Body, doe Extinguish and Suffocate the *Naturall Spirits*, and *Heat*.

335 The Seventh is, by such a *Weake Degree of Heat, as setteth the Spirits in a little Motion, but is not able, either to digest the Parts, or to Issue the Spirits*; As is seene in Flesh kept in a Roome that is not Coole; Whereas in a Coole and Wet Larder it will keepe longer. And wee see, that *Vivification* (whereof *Putrefaction* is the *Bastard Brother*,) is effected by such Soft Heats; As the Hatching of Egges; The Heat of the Woombe, &c.

336 The Eight is, by the *Releasing of the Spirits*; which before were close kept by the Solidnesse of their Coverture; and thereby their Apperite of Issuing checked: As in the *Artificiall Rusts* induced by strong Waters, in *Iron, Lead*, &c. And therefore *Wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softeneth the Crust, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and dry*; As wee see in the Mouldring of Earth in Frosts, and Sunne; And in the more hasty Rooting of Wood, that is sometimes wet, sometimes dry.

338 The Tenth is, by *Time, and the Worke and Procedure of the Spirits themselves*, which cannot keepe their Station; Especially if they be left to themselves; And there be not Agitation or Locall Motion. As wee see in Corne not stirred; And Mens Bodies not exercised.

339 All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*, and *Flesh*; the *Moulds* of *Oranges*, and *Limons*; which *Moulds* afterwards turne into Wormes, or more odious *Putrefactions*: And therefore (commonly) prove to be of ill Odour. And if the Body be Liquid, and not apt to purifie totally, it will cast up a *Mother* in the Top: As the *Mothers* of *Distilled Waters*.

340 *Mosse* is a Kinde of *Mould*, of the Earth, and Trees. But it may be better sorted as a *Rudiment* of *Germination*; To which we referre it.

Experiments in Consort, touching *Prohibiting* and *Preventing Putrefaction*.

It is an *Enquiry* of Excellent use, to Enquire of the *Meanes* of *Preventing* or *Staying Putrefaction*; For therein consisteth the *Meanes* of *Conservation* of *Bodies*; For *Bodies* have two Kindes of *Dissolutions*; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions* of

of the *Bodies* of *Men*, and *Living Creatures*, (as in Agues, Wormes, Consumptions of the Lungs, Impostumes, and Ulcers both Inwards and Outwards,) they are a great *Part of Physicke*, and *Surgery*: And therefore we will reserve the *Enquiry* of them to the proper Place, where we shall handle *Medicinall Experiments* of all Sorts. Of the rest we will now Enter into an Enquiry: wherein much light may be taken, from that which hath beene said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*. For the Removing that, which causeth *Putrefaction*, doth Prevent and Avoid *Putrefaction*.

341 The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so wee see that Meat and Drinke will last longer, Unputrified, or Unsowred, in Winter, than in Summer; And we see that Flowers, and Fruits, put in Conservatories of Snow, keepe fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*.

342 The Second is *Astriction*: For *Astriction* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibite *Putrefaction*: And by the same reason of *Astringency*, some small Quantitie of Oile of Vitriol, will keepe Fresh Water long from *Putrefying*. And this *Astriction* is in a Substance that hath a *Virtuall Cold*; And it worketh (partly) by the same Meanes that Cold doth.

343 The Third is, the Excluding of the *Aire*: And againe, the *Exposing to the Aire*: For these Contraries, (as it commeth often to passe,) worke the same Effect, according to the Nature of the Subject Matter. So we see, that *Beere*, or *Wine*, in Bottles close stopped, last long; That the *Garners under Ground* keepe Corne longer than those above Ground; And that *Fruit closed in Wax* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flowers*, keepe more fresh: And *Liquours*, *Drinkes*, and *Iuices*, with a little *Oyle* cast on the Top, keepe fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired*, doe breed Moathes, and Mould; And the Diversitie is, that in *Bodies* that need *Detension* of *Spirits*, the *Exclusion of the Aire* doth good: As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emission* of *Spirits*, to discharge some of the Superfluous Moisture, it doth hurt, for they require *Airing*.

344 The fourth is *Motion*, and *Stirring*: For *Putrefaction* asketh *Rest*; For the Subtill *Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together: As we see that Turning over of Corne in a Garner, Or Letting it runne like an Houre-glasse, from an upper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens Bodies, Exercise hindreth *Putrefaction*: And contrariwise *Rest*, and Want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perspiration, is stayed,) further *Putrefaction*; As we partly touched a little before.

345 The Fifth is, the *Breathing forth of the Adventitious Moisture in Bodies*; For as *Wetting* doth hasten *Putrefaction*; So *Convenient Drying*, (whereby the more *Radicall Moisture* is onely kept in,) putteth backe *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the Shade; Or dried in the hot Sunne, for a small time, keepe best. For the *Emission* of the *Loose* and *Adventitious Moisture*, doth betray the *Radicall Moisture*; And carryeth it out for Company.

346 The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a Strong *Spirit* likewise preserveth, and a Weake or Faint *Spirit* disposeth to *Corruption*. So we finde that Salt-water corrupteth not so soone as Fresh: And Salting of Oisters, and Powdring of Meat, keepeth them from *Putrefaction*. It would be tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserve it from *Putrefying*, or speedy Souring. So wee see that *Strong Beere* will last longer than Small; And all Things, that are Hot and Aromaticall, doe helpe to Preserve Liquours, or Powders, &c. Which they doe, as well by Strengthning the *Spirits*, as by Soaking out the loose *Moisture*.

347 The Seventh is, *Separation of the Cruder Parts*, and thereby *making the Body more Equall*; for all unperfect Mixture is apt to *Putrefie*; And Watry Substances are more apt to *Putrefie*, than Oyly. So we see Distilled Waters will last longer, than Raw waters; And Things that have passed the Fire, doe last longer, than those that have not passed the Fire; As Dried Peares, &c.

348 The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Loose and watry Moisture*; Not onely for the Reason before given, that it provoketh the *Radicall Moisture* to come forth with it; But because being detained in the Body, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming dead Bodies*: And the same Reason is of *Preserving Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

349 The Ninth is, the *Commixture of any Thing that is more Oily*, or *Sweet*: For such *Bodies* are least apt to *Putrefie*, the *Aire* working little upon them; And they not putrefying preserve the rest. And therefore we see *Syrrups*, and *Ointments*, will last longer, than *Iuyces*.

350 The Tenth is, the *Commixture of somewhat that is Dry*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is dry is unapt to putrefie: And therefore Smoake preserveth Flesh; As wee see in Bacon, and Neats-Tongues, and Martlemas Beefe, &c.

351 The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserve Bodies, longer than other *Aires*, seemeth to Mee Probable; For that the *Blowne Aires*, being Over-charged and Compressed, will hardly receive the Exhaling of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, wherein to Flesh was put, and likewise a Flower, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather further *Putrefaction*: The way were therefore, to blow strongly, with a Paire of Bellowes, into a Hogshead, putting into the Hogshead (before) that which you would have preserved; And in the instant that you withdraw the Bellowes, stop the Hole close.

Experiment Solitary touching *Wood Shining* in the *Darke*.

352 THe *Experiments* of *Wood* that *Shineth* in the *Darke*, we have diligently driven, and pursued: The rather, for that of all Things, that give Light here below, it is the most Durable; And hath least Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* shineth onely while it is in Scraping; And *Salt-water* while it is in Dashing; *Glow-wormes* have their Shining while they live, or a little after; Onely *Scales* of *Fishes* (Putrified) seeme to be of the same Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* sorted thus. 1. The *Shining* is in some Peeces more *Bright*, in some more *Dimme*; but the most *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *Woods* that have beene tried to shine, are chiefly *Sallow*, and *willow*; Also the *Ash*, and *Hasle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe shine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Day-light, is in some Peeces *White*, in some Peeces inclining to *Red*; Which in the Countrey they call the *white*, and *Red Garret*. 5. The Part that Shineth, is, (for the most part) somewhat *Soft*, and *Moist* to feele to; But some was found to be *Firme* and *Hard*; So as it might be figured into a Crosse, or into Beads, &c. But you must not looke to have an Image, or the like, in any Thing that is Lightsome; For even a face in Iron red Hot will not be seene, the Light confounding the small differences of Lightsome and Darksome, which shew the figure. 6. There was the *Shining Part pared off*, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* began also to *shine*, being laid abroad in the Dew; So as it seemeth the Putrefaction spreadeth. 7. There was other dead *Wood* of like kind, that was *Laid abroad*, which *shined* not at the first: But after a Nights lying abroad began to *shine*. 8. There was other *Wood*, that did *First Shine*; And being laid dry in the House, within five or six dayes, *Lost* the *Shining*; And laid abroad againe, *Recovered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a Seven night, lost their Shining; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boring of Holes*, in that kinde of Wood, and then laying it abroad, seemeth to conduce to make it *Shine*: The *Cause* is, for that all *Solution* of *Continuitie* doth helpe on *Putrefaction*, as was touched before. 11. No *Wood* hath beene yet tryed to *Shine*, that was cut *downe alive*, but such as was *Rotted*, both in Stocke, and Roote, while it grew. 12. Part of the *Wood* that *Shined*, was *steeped in Oyle*, and retained the *Shining* a Fortnight. 13. The like succeeded in some *Steeped* in *Water*, and much better. 14. How long the *Shining* will continue, if the *Wood* be *laid abroad every Night*, and *taken in*, and *Sprinkled* with *Water* in the *Day*, is not yet tryed. 15. Triall was made

made of *laying it abroad in Frostie weather*, which hurt it not. 16. There was a great *Peece of a Root* which did shine, and the *Shining Part* was *Cut off*, till no more Shined; Yet after two Nights, though it were kept in a drie Roome, it got a *Shining*.

Experiment Solitary touching the Acceleration of Birth.

353 THe *Bringing forth* of *living Creatures* may be *accelerated* in two Respects: The one, if the *Embryon ripeneth* and perfecteth sooner: The other, if there be some Cause from the *Mothers Body*, of *Expulsion* or Putting it downe: whereof the Former is good, and argueth Strength; The Latter is ill, and commeth by Accident or Disease. And therefore the Ancient *Observation* is true, that the *Childe borne in the Seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the most part) die. But the *Cause* assigned is Fabulous; Which is, that in the Eighth Moneth, should be the Returne of the Raigne, of the *Planet Saturne*: which (as they say) is a *Planet* Maligne; whereas in the Seventh is the Raigne of the *Moone*, which is a Planet Propitious. But the true *Cause* is, for that where there is so great a Prevention of the Ordinary time, it is the *lustinesse* of the *Childe*; But when it is lesse, it is some *Indisposition* of the *Mother*.

Experiment Solitary touching the Acceleration of growth and Stature.

354 TO *Accelerate Growth* or *Stature*, it must proceed; Either from the *Plentie* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the first, *Excesse of Nourishment* is hurtfull; For it maketh the Childe Corpulent; And Growing in Breadth, rather than in Heigth. And you may take an Experiment from *Plants*, which, if they spread much, are seldome tall. As for the *Nature* of the *Nourishment*; First, it may not be too *Drie*; And therefore Children in Dayrie Countries doe wax more tall, than where they feed more upon Bread, and Flesh. There is also a received Tale; That Boyling of *Dasie Roots* in *Milke* (which it is certaine are great Driers) will make *Dogs* little. But so much is true, that an *Over-drie Nourishment* in Child-hood putteth backe Stature. Secondly, the *Nourishment* must be of an *Opening Nature*; For that Attenuateth the Juice; and furthereth the Motion of the Spirits, upwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their Feeding upon *Cardamon*; which (he saith) made them grow better, and be of a more Active Habit. *Cardamon* is in Latine *Nasturtium*; And with us *Water-Cresses*; Which, it is certaine, is an Herbe, that whilest it is young, is Friendly to Life. As for the *Quickening* of *Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much Going to Schoole, where they sit so much, hindreth the *Growth* of *Children*; whereas Countrey People, that goe not to Schoole, are commonly of Better Stature. And againe Men must beware, how they give *Children*, any thing that is *Cold* in Operation; For even *Long Sucking* doth hinder both *Wit*, and *Stature*. This hath beene tryed, that a Whelpe, that hath beene fed with *Nitre* in *Milke*, hath become

come very little, but extreme lively: For the *Spirit* of *Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to *Growth*: And all for the same Reason; For *Heat* is requisite to Growth: But after a Man is come to his Middle Age, *Heat* consumeth the Spirits; which the Coldnesse of the Spirit of *Nitre* doth helpe to condense, and correct.

Experiments in Consort touching Sulphur and Mercury, two of Paracelsus Principles.

There be two *Great Families* of *Things*; You may terme them by severall Names; *Sulphureous* and *Mercuriall*, which are the *Chymists* Words: (For as for their *Sal*, which is their Third Principle, it is a Compound of the other two;) *Inflammable* and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For we see that in *Subterranies* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury*: In *Vegetables*, and *Living Creatures* there is *Water* and *Oile*: In the *Inferiour Order* of *Pneumaticalls* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they be unlike in the Primitive Differences of Matter, yet they seeme to have many Consents: For *Mercury* and *Sulphur* are principall Materials of *Metalls*; *Water* and *Oyle*, are principall Materials of *Vegetables*, and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in Vulgar Opinion) is but *Aire Incensed*; And they both have Quicknesse of Motion, and Facilitie of Cession, much alike: And the *Interstellar Sky* (though the Opinion be vaine, that the *Starre* is the *Denser Part* of his *Orbe*) hath notwithstanding so much Affinity with the *Starre*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Naturæ*, to turne *Water*, or *Watry Juyce* into *Oile* or *Oily Juyce*; Greater in Nature, than to turne *Silver*, or *Quick-silver*, into *Gold*.

The Instances wee have, wherein *Crude* and *Watry* Substance turneth into *Fat* and *Oily*, are of foure kindes. First in the *Mixture* of *Earth* and *Water*; which mingled by the helpe of the Sunne, gather a Nitrous Fatnesse, more than either of them have severally; As we see, in that they put forth *Plants*, which need both Juyces. 355

The Second is in the *Assimilation* of *Nourishment*, made in the Bodies of *Plants*, and *Living Creatures*; Whereof *Plants* turne the Juyce of meere *Water* and *Earth*, into a great deale of *Oily Matter*: *Living Creatures*, 356

tures; though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*, (as *Meat*, and *Bread*,) yet they Assimilate also in a Measure their *Drinke* of *Water*, &c. But these two Wayes of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time.

357 The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which have a kinde of *Fatnesse*, or *Oyle*.

358 The Fourth is in the *Dulcoration* of some *Metalls*; As *Saccharum Saturni*, &c.

359 The Intention of *Version* of *Water* into a more *Oyly Substance*, is by *Digestion*; For *Oyle* is almost Nothing else but *Water Digested*; And this *Digestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Againe, it may be by Provocation, or Excitation; Which is caused by the Mingling of Bodies already *Oily*, or *Digested*; For they will somewhat Communicate their Nature with the rest. *Digestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Digested*; As in *Plants*, and *Living Creatures*, whose Nourishment is far more Crude than their Bodies: But this *Digestion* is by a great Compasse, as hath beene said. As for the more full Handling of these two Principles, whereof this is but a Taste; (the Enquiry of which is one of the Profoundest Enquiries of Nature,) We leave it to the *Title* of *Version of Bodies*; And likewise to the *Title* of the *First Congregations of Matter*; Which like a Generall Assembly of Estates, doth give Law to all *Bodies*.

Experiment Solitary touching *Chameleons*.

360 A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head unproportionably bigge; His Eyes great: He mooveth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth: His Backe crooked; His Skin spotted with little Tumours, lesse Eminent nearer the Belly; His Taile slender, and long: On each Foot he hath five Fingers, three on the Outside, and two on the Inside; His Tongue of a marvellous Length in respect of his Body, and hollow at the end; Which he will launch out to prey upon *Flies*. Of Colour Greene, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If he be laid upon Greene, the Greene predominateth; If upon Yellow, the Yellow; Not so if he be laid upon Blew, or Red, or White; Onely the Greene Spots receive a more Orient Lustre. Laid upon Blacke, he looketh all Blacke, though not without a Mixture of Greene. He feedeth not onely upon *Aire*, (though that be his principall Sustenance;) For sometimes hee taketh *Flies*, as was said. Yet some that have kept *Chameleons* a whole yeare together, could never perceive that ever they fed upon any Thing else but Aire; And might observe their Bellies to swell after they had exhausted the Aire, and closed their Jawes; Which they open com-

monly

monly against the Rayes of the Sunne. They have a foolish Tradition in *Magicke*, that if a *Chameleon* be burnt upon the Top of an House, it will raise a Tempest; Supposing (according to their vaine Dreames of *Sympathies*) because hee nourisheth with Aire, his Body should have great vertue to make Impression upon the Aire.

Experiment Solitary, touching *Subterrany Fires*.

361 It is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that those *Flames* are cleare, & cast not forth such Smoake, and Ashes, and Pummice, as *Mountaine Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountaines*, and *Earth-quakes* which cast *Flame*. There be also some *Blinde Fires*, under *Stone*, which flame not out, but *Oile* being powred upon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remove the Stone, it is *Heat*, rather than *Flame*; Which neverthelesse is sufficient to Enflame the *Oyle*.

Experiment Solitary touching *Nitre*.

362 It is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if Foule Cloaths be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the Scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And wee see *Warme Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which severeth and divideth any thing that is foule, and Viscous, and sticketh upon a Body.

Experiment Solitary touching *Congealing* of *Aire*.

363 Take a *Bladder*, the greatest you can get; Fill it full of Winde, and tye it about the Necke with a Silke thred waxed; And upon that likewise Wax very close; So that when the Necke of the *Bladder* drieth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot under the *Earth*, in a *Vault*, or in a *Conservatory* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after some Fortnights distance, see whether the *Bladder* be shrunke: For if it be, then it is plaine, that the *Coldnesse* of the *Earth*, or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Consequence.

Experiment Solitary touching *Congealing* of *Water* into *Chrystall*.

364 It is a Report of some good credit; that in *Deepe Caves*, there are *Pensile Crystall*, and *Degrees* of *Chrystall* that drop from above; And in some other, (though more rarely,) that rise from below. Which though it be chiefly the Worke of Cold, yet it may bee, that Water, that passeth thorow the Earth, gathereth a Nature more clammy, and fitter to Congeale, and become Solide, than Water of it selfe. Therefore Triall would be made, to lay a Heape of Earth, in great Frosts, upon a Hollow Vessell, putting a Canvase betweene, that it falleth not in: And powre Water upon it, in such Quantitie as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessell,

and

and lesse apt to dissolve, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reversed, it will helpe the Experiment. For it will make the Ice, where it Issueth, lesse in Bulke; And evermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment Solitary touching *Preserving* of *Rose-leaves*, both in *Colour*, and *Smell*.

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TAke *Damaske Roses*, and pull them; Then dry them upon the Top of an House, upon a Lead or Tarras, in the hot Sun, in a cleare day, between the Houres (onely) of twelue and two; or there abouts. Then put them into a Sweet *Dry Earthen Bottle*, or a *Glasse*, with narrow Mouthes, stuffing them close together, but without Bruising: Stop the *Bottle*, or *Glasse*, close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other body, either by *Putrefaction*, or *Arefaction*, as the *Adventitious Moisture*, which hangeth loose in the Body, if it bee not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture*, along with it, when it selfe goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserve the Juyce of the Body. Note that these *Roses*, when you take them from the *Drying*, have little or no *Smell*; So that the Smell is a Second *Smell*, that issueth out of the *Flower* afterwards.

Experiments in Consort, touching the *Continuance* of

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THe *Continuance* of *Flame*, according unto the diversity of the *Body Enflamed*, & other Circumstances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almost) of a Momentany Lasting, yet it receiveth the More, and the Lesse: we will first therefore speake (at large) of *Bodies Enflamed*, wholly, and Immediately, without any *Wicke* to helpe the *Inflammation*. A Spoonefull of *Spirit* of *Wine*, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of *Spirit* of *Wine*, Mixed with the Sixth Part of a Spoonefull of *Nitre* burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay-salt*, 83. Pulses. Mixed with the like Quantity of *Vnpurified* [illegible] which dissolved into a Blacke water, 110. Pulses. A Cube, or Peller of *Yellow Waxe*, was taken, as much as halfe the *Spirit* of *Wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonefull of *Milke*, it burnt to the space of 100. Pulses; And the [illegible] was curdled. Mixed with the Sixth Part of a spoonefull of *Water*, it burnt to the space of 86. Pulses; With an *Equall Quantity* of *Water*, onely to the space of 4. Pulses. A small *pebble* was laid in the Middest, and the *Spirit* of *Wine* burnt to the space of 94. Pulses. A Peece of *Wood*, of the Bignesse of an Arrow, and about a Fingers length, was set up in the Middest, and the *Spirit* of *Wine* burnt to the space of 94. Pulses. So that the *Spirit* of *Wine Simple*, endured the longest. And the *Spirit* of *Wine* with the *Bay-salt*, and the *Equall Quantity of Water*, were the shortest.

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Consider well, whether the more speedy *Going forth of the flame*, be caused,

caused, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Aversion* thereof to take *Flame*: Which will appeare by the Quantitie of the *Spirit* of *Wine*, that remaineth after the Going out of the *Flame*. And it seemnth cleerely to be the latter; For that the Mixture of Things least apt to burne, is the Speediest in going out. And note, by the way, that *Spirit* of *wine* burned, till it goe out of it selfe, will burne no more; And tasteth nothing so hot in the Mouth, as it did; No nor yet sowre, (as if it were a degree towards *Vinegar*,) which *Burnt Wine doth*; but flat and dead.

Note, that in the *Experiment* of *wax* aforesaid, the *Wax* dissolved in the burning, and yet did not incorporate it selfe, with the *Spirit* of *Wine*, to produce one *Flame*; but whersoever the *Wax* floated, the *Flame* forsooke it, till at last it spread all over, and put the *Flame* quite out. 368

The *Experiments* of the *Mixtures* of the *Spirit* of *Wine enflamed*, are Things of discoverie, and not of Use: But now wee will speake of the *Continuance* of *Flames*, such as are used for *Candles*, *Lamps*, or *Tapers*; consisting of *Inflammable Matters*, and of a *wicke* that provoketh *Inflamation*. And this importeth not only Discoverie, but also Use and Profit; For it is a great Saving, in all such Lights, if they can be made as faire and bright as others, and yet last longer. *Wax Pure* made into a Candle, and *Wax Mixed* severally into Candle-stuffe, with the Particulars that follow; (viz. *Water*, *Aqua-vitæ*, *Milke*, *Bay-salt*, *Oyle*, *Butter*, *Nitre*, *Brimstone*, *Saw-dust*,) Every of these bearing a Sixth Part to the *wax*; And every of these *Candels Mixed*, being of the same Weight and Wicke with the *Wax Pure*, proved thus in the Burning, and Lasting. The Swiftest in Consuming was that with *Saw-dust*; Which first burned faire, till some part of the *Candle* was consumed, and the Dust gathered about the Snaste; But then it made the Snaste bigge, and long, and to burne dusskishly, and the *Candle* wasted in halfe the time of the *Wax Pure*. The next in Swiftnesse, were the *Oyle*, and *Butter*, which consumed, by a Fifth part, swifter than the *Pure Wax*. Then followed in Swiftnesse the *Cleare Wax* it selfe. Then the *Bay-Salt*, which lasted about an Eighth part longer than the *Cleare wax*. Then followed the *Aqua-vitæ*, which lasted about a Fifth part longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vitæ*, but the *Water* slowest. And in these foure last, the *Wicke* would spit forth little Sparks. For the *Nitre*, it would not hold lighted above some Twelve Pulses; But all the while it would spit out Portions of *Flame*, which afterwards would goe out into a vapour. For the *Brimstone*, it would hold lighted, much about the same with the *Nitre*; But then after a little while, it would harden and cake about the Snaste; So that the Mixture of *Bay-Salt* with *Wax*, will winne an Eighth part of the time of lasting, and the *Water* a Fifth. 369

After the Severall *Materialls* were tried, Triall was likewise made of severall *Wickes*; As of Ordinary *Cotton*; *Sowing Thred*; *Rush*; *Silke*; *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they 370

they came to the *Wax*, and then goe out: of the Other Three, the *Thred* consumed faster than the *Cotten*, by a Sixth part of Time: The *Cotton* next: Then the *Rush* consumed slower than the *Cotton*, by at least a third part of time. For the Bigneſſe of the *Flame*, the *Cotton*, and *Thred*, caſt a *Flame* much alike; and the *Rush* much leſſe, and dimmer. *Quære*, whether *Wood*, and *Wickes* both, as in *Torches*, conſume faſter, than the *Wickes Simple?*

371 Wee have ſpoken of the Severall *Materialls*, and the Severall *Wickes*: But to the *laſting* of the *Flame*, it importeth alſo; Not only what the *Materiall* is, but in the ſame *Materiall*, whether it be Hard, Soft, Old, New &c. Good *Houſwives*, to make their *Candles* burne the longer, uſe to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and ſo they Conſume the ſlower: Inſomuch, as by this meanes, they will out-laſt other *Candles*, of the ſame Stuffe, almoſt Halfe in Halfe. For *Bran* and *Flower* have a Vertue to Harden: So that both Age, and lying in the Bran, doth helpe to the Laſting. And wee ſee that *Wax Candles* laſt longer than *Tallow Candles*, bacauſe *Wax* is more firme, and hard.

372 The *Laſting* of *Flame* alſo dependeth upon the *eaſie Drawing* of the *Nouriſhment*; As we ſee in the *Court* of *England*, there is a Service which they call *All-night*; which is (as it were) a great Cake of Wax, with the Wicke in the middeſt; whereby it commeth to paſſe, that the Wicke fetcheth the Nouriſhment further off. Wee ſee alſo that *Lamps* laſt longer, becauſe the Veſſell is farre broader, than the Bredth of a Taper, or Candle.

373 Take a *Turreted Lampe* of *Tinne*, made in the forme of a Squire; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* ſtandeth: Make only one Hole in it, at the Ende of the Returne furtheſt from the *Turret*. Reverſe it, and fill it full of *Oile*, by that Hole; And then ſet it upright againe; And put a Wicke in at the Hole; And lighten it: You ſhall finde, that it will burne ſlow, and a long time. Which is cauſed, (as was ſaid laſt before,) for that the *Flame* fetcheth the *Nouriſhment a farre off*. You ſhall finde alſo, that as the *Oile* waſteth, and deſcendeth, ſo the Top of the *Turret*, by little and little, filleth with Aire; which is cauſed by the Rarefaction of the Oile by the Heat. It were worthy the Obſervation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almoſt conſumed, whether the Aire made of the *oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good alſo to have the *Lampe* made, not of *Tinne*, but of *Glaſſe*, that you may ſee how the Vapour, or Aire gathereth, by degrees, in the Top.

374 A fourth Point, that importeth the *laſting* of the *Flame*, is the *Cloſeneſſe* of the *Aire*, wherein the *Flame* burneth. Wee ſee, that if *Wind* bloweth upon a *Candle*, it waſteth apace. We ſee alſo, it laſteth longer in a *Lanthorne*, than at *large*. And there are Traditions of *Lamps*, and *Candles*, that have burnt a very long time, in *Caves*, and *Tombes*.

375 A Fifth Point, that importeth the *Laſting* of the *Flame*, is the *Nature* of

of the *Aire*, where the *Flame* burneth; whether it bee Hot or Cold; Moiſt or Drie. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire ſcorcheth in Froſtie weather;) And ſo further eth the *Conſumption*. The *Aire* once heated, (I conceive) maketh the *Flame* burne more mildly, and ſo helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent: The *Aire*, if it be *Miſt*, doth in a Degree quench the *Flame*: (As wee ſee *Lights* will goe out in the *Damps* of *Mines*:) And howſoever maketh it burne more dully: And ſo helpeth the *Continuance*.

Experiments in Conſort, touching *Burialls* or *Inſuſions* of diuers *Bodies* in *Earth*.

Burialls in *Earth* ſerve for *Preſervation*; And for *Condenſation*; And for *Induration* of *Bodies*. And if you intend *Condenſation*, or *Induration*, you may burie the *Bodies* ſo, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may doe for *Conſervation*, if the *Bodies* be Hard, and Solid; As Clay, Wood, &c. But if you intend *Preſervation* of *Bodies*, more Soft and Tender, then you muſt doe one of theſe two: Either you muſt put them in *Caſes*, whereby they may not touch the *Earth*; Or elſe you muſt *vault* the *Earth*, whereby it may hang over them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the Moiſture, cauſing them to putrifie, than good by the virtuall Cold, to conſerve them; Except the *Earth* be very Drie, and Sandie.

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377 An *Orenge*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Forthnights Space, foure Foot deepe within the Earth, though it were in a Moiſt Place, and a Rainie Time, yet came forth, no wayes Mouldie, or Rotten, but were become a little harder than they were; Otherwiſe freſh in their Colour; But their Juyce ſomewhat flatted. But with the *Buriall* of a Forthnight more they became Putrified.

378 A *Bottle* of *Beere*, *buried* in like manner, as before, became more lively, better taſted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, ſo buried, came forth more lively, and more Odoriferous, ſmelling almoſt like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as freſh and lively, if not better, than before.

379 It were a profitable *Experiment*, to preſerve *Orenges*, *Limons*, and *Pomgranates*, till Summer; For then their Price will bee mightily increaſed. This may be done, if you put them in a Pot or Veſſell, well covered, that the *Moiſture* of the *Earth* come not at them; Or elſe by putting them in a *Conſervatorie* of *Snow*. And generally, whoſoever will make *Experiments* of *Cold*, let him bee provided of three Things; A *Conſervatorie* of *Snow*; A good *large Vault*, twenty foot at leaſt under the Ground; And a *Deepe Well*.

380 There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that have loſt their Colours, may be recovered by *Burying* in the *Earth*: Which is a thing of great profit, if it would ſort: But upon Triall of Six Weekes *Buriall*, there followed no Effect. It were good to trie it, in

in a *Deepe Well*; Or in a *Conservatory* of *Snow*, where the Cold may bee more Constringent; And so make the *Body* more united, and thereby more Resplendent.

Experiment Solitary touching the *Affects* in Mens Bodies from Severall Winds. 381

MEn *Bodies* are heavier, and lesse disposed to Motion, when *Southern Winds* blow, than when *Northerne*. The *Cause* is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt, and wax fluide, and so flow into the Parts; As it is seene in *Wood*, and other *Bodies*; which, when the *Southerne Winds* blow, doe swell. Besides, the Motion and Activity of the Body consisteth chiefly in the Sinewes, which, when the *Southerne Wind* bloweth, are more relax.

Experiment Solitary touching *Winter* and *Summer* Sicknesses. 382

IT is commonly seene, that more are *Sicke* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly raigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefly by *Heat*; But then they are Cured most by *Sweat*, and *Purge*, which in the *Summer* commeth on, or is provoked, more Easily: As for *Pestilent Diseases*, the Reason why most Dye of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most Danger in the *Winter*.

Experiment Solitary touching *Pestilent* all Seasons. 383

THe Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Upon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there have beene great *Plagues* in *Dry Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it taints the *Waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake up in the *Summer moneths*, when the *Weather* is *Hot* and *Dry*.

Experiment Solitary touching an *Error* received about *Epidemicall Diseases*. 384

MAny *Diseases*, (both *Epidemicall* and others,) breake forth at *Particular times*. And the *Cause* is falsely imputed to the *Constitution* of the *Aire*, at *that time*, when they *breake forth*, or *raigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*. And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the *Diseases*, that ensue upon the *Natures*, of the *Precedent Seasons* of the *Yeare*.

Experiment Solitary touching the *Alteration* or *Preservation* of *Liquors* in *Wells*, or *deepe Vaults*. 385

TRiall hath beene made, with *Earthen Bottles* well stopped, hanged in a *Well* of *Twenty Fathome* deepe, at the least; And some of the *Bottles* have beene let downe into the *Water*, some others have hanged above, within about a fathome of the *Water*; And the *Liquours* so tried have beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Proofe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as above;) have not beene palled or deaded at all; But

as good, or somewhat better, than *Bottles* of the same *Drinks*, and Stalenesse, kept in a *Cellar*. But those which did hang above *Water*, were apparently the best; And that *Beere* did flower a little; whereas that under *Water* did not, though it were Fresh. The *Milke* sowered, and began to Putrifie. Nevertheless it is true, that there is a *Village* neare *Blois*, where in *Deepe Caves* they doe thicken *Milke*; In such sort, that it becommeth very pleasant; Which was some *Cause* of this Triall of Hanging *Milke* in the *well*: But our proofe was naught; Neither doe I know, whether that *Milke* in those *Caves*, be first boyled. It were good therefore to try it with *Milke* Sodden, and with Creame; For that *Milke* of it selfe is such a Compound Body, of *Creame*, *Curds*, and *Whey*, as it is easily Turned, and Dissolved. It were good also to try the *Beere*, when it is in *wort*, that it may be seene, whether the *Hanging* in the *Well*, will Accelerate the *Ripening* and *Clarifying* of it.

Experiment Solitary, touching *Stutting*. 386

DIvers, wee see, doe *Stut*. The *Cause* may bee, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to move. And therefore we see, that *Naturalls* doe generally *Stut*: And we see that in those that *Stut*, if they drinke Wine moderately, they *Stut* lesse, because it heateth: And so we see, that they that *Stut*, doe *Stut* more in the first Offer to speake, than in Continuance; Because the *Tongue* is, by Motion, somewhat heated. In some also, it may be, (though rarely,) the *Drinesse* of the *Tongue*; which likewise maketh it lesse apt to move, as well as *Cold*, For it is an Affect that it cometh to some *Wise* and *Great Men*; As it did unto *Moses*, who was *Linguæ præpeditæ*; And many *Stutters* (wee finde) are very *Cholericke Men*; *Choler* Enducing a *Drinesse* in the *Tongue*.

Experiments in Consort, touching *Smells*. 387

Smells, and other *Odours*, are Sweeter in the Aire, at some Distance, than neare the Nose; As hath beene partly touched heretofore. The *Cause* is double: First the finer Mixture, or Incorporation of the *Smell*: For wee see that in *Sounds* likewise, they are Sweetest, when we cannot heare every Part by it selfe. The other *Reason* is, for that all *Sweet Smells* have joyned with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more Spirituall, is Perceived; And the *Earthy* reacheth not so farre.

388

Sweet Smells are most forcible, in *Dry Substances*, when they are *Broken*; And so likewise in *Orenges*, or *Limons*, the Nipping of their Rinde, giveth out their *Smell* more: And generally, when *Bodies* are *Moved* or *Stirred*, though not *Broken*, they *Smell* more; As a Sweet-Bagge waved. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when Way is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some degree) in the Moving: But in this last, there is a Concurrence of the Second *Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster upon us.

389

The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaves*

smell not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pincks*, *Woodbines*, *Vine-flowers*, *Apple-Bloomes*, *Lime-Tree Bloomes*, *Beane-Bloomes*, &c. The *Cause* is, for that where there is Heat and ſtrength enough in the *Plant*, to make the *Leaves Odorate*, there the *Smell* of the *Flower* is rather Evanide and Weaker, than that of the *Leaves*; As it is in *Roſe-Mary-Flowers*, *Lavender-Flowers*, and *Sweet-Briar-Roſes*. But where there is leſſe Heat, there the *Spirit* of the *Plant* is diſgeſted and refined, and ſevered from the Groſſer Iuyce, in the *Efflorescence*, and not before.

390 Moſt *Odours* ſmell beſt, *Broken* or *Cruſht*, as hath beene ſaid; But *Flowers Preſſed* or *Beaten*, doe leeſe the Freſhneſſe and Sweetneſſe of their *Odour*. The *Cauſe* is, for that when they are *Cruſhed*, the Groſſer and more *Earthy* ſpirit commeth out with the Finer, and troubleth it; Whereas in ſtronger *Odours* there are no ſuch Degrees of the Iſſue of the *Smell*.

Experiments in Conſort, touching the *Goodneſſe* and *Choice* of *Water*.

IT is a Thing of very good Uſe, to Diſcover the *Goodneſſe* of *Waters*. The *Taſte*, to thoſe that Drinke *Water* only, doth ſomewhat: But other *Experiments* are more ſure. First, try *Waters* by *Weight*; Wherein you may finde ſome difference, though not much: And the *Lighter* you may account the Better.

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392 Secondly, try them by *Boyling* upon an *Equall Fire*: And that which conſumeth away faſteſt, you may account the Beſt.

393 Thirdly, try them in *Severall Bottles*, or Open Veſſells, Matches in every Thing elſe, and ſee which of them *Laſt Longeſt*, without *Stench*, or *Corruption*. And that which holdeth Unputrified longeſt, you may likewiſe account the Beſt.

394 Fourthly, try them by *Making Drinkes* Stronger, or Smaller, with the ſame *Quantity* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more Concocted, and Nourishing; though perhaps it bee not ſo good for *Medicinall uſe*. And ſuch *Water* (commonly) is the *Water* of *Large* and *Navigable Rivers*: And likewiſe in *Large* and *Cleane Ponds* of *Standing water*: For upon both them, the Sunne hath more power, than upon Fountaines, or Small Rivers. And I conceieve that *Chalke-water* is next them the beſt, for going furtheſt in *Drink*: For that alſo helpeth *Concoction*; So it bee out of a *Deepe Well*; For then it Cureth the Rawneſſe of the *Water*; But *Chalkie water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloaths, which weare out apace, if you uſe ſuch *Waters*.

395 Fifthly, the Houſwives doe finde a Difference in *Waters*, for the *Bearing*, or *Not-Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* beſt; For the *Hungry water* doth kill the Unctuous Nature of the *Soape*.

396 Sixthly, you may make a Judgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Raine-water* is, by the *Phyſitians* eſteemed the Fineſt, and the beſt; But yet it is ſaid to putrifie ſooneſt; which is likely, becauſe of the Fineneſſe of the Spirit: And in *Conſervatories*

ſervatories of *Raine-water*, (ſuch as they have in *Venice*, &c.) they are found not ſo Choice *Waters*; The worſe, (perhaps,) becauſe they are Covered aloft, and kept from the Sunne. *Snow-water* is held unwholeſome; In ſo much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwiſe upon the Aſcent, (eſpecially the Women,) by drinking of *Snow-water*, have great Bagges hanging under their Throats. *Well-water*, except it bee upon *Chalke*, or a very plentifull Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the beſt: For both they ſeeme to have a Lightneſſe, and Appetite of Mounting; And beſides they are moſt pure and Unmingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Valleyes*, joyne in effect under Ground with all *Waters* of the ſame Levell; Whereas *Springs*, on the *Tops* of *Hills*, paſſe thorow a great deale of Pure *Earth*, with leſſe Mixture of other *Waters*.

Seventhly, Judgement may bee made of *Waters* by the *Soyle whereupon the Water runneth*; As *Pebble* is the Cleaneſt, and beſt taſted; And next to that *Clay-water*; And Thirdly, *Water* upon *Chalke*; Fourthly that upon *Sand*; And Worſt of all upon *Madde*. Neither may you truſt *Waters* that *Taſte Sweet*; For they are commonly found in Riſing Grounds of great *Cities*; which muſt needs take in a great deale of Filth. 397

Experiment Solitary touching the *Temperate Heat* under the *Æquinoctiall*.

IN *Peru*, and divers Parts of the *Weſt Indies*, though under the *Line*, the *Heats* are not ſo Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Cauſes* are, Firſt the Great *Brizes*, which the Motion of the Aire in great Circles, (ſuch as are under the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in thoſe Parts Noone is nothing ſo hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cauſe* is, for that the Length of the Night, and the Dewes thereof, doe compenſe the *Heat* of the Day. A third *Cauſe* is the Stay of the Sunne; Not in Reſpect of Day and Night, (for that wee ſpake of before,) but in Reſpect of the Seaſon; For under the *Line*, the Sunne croſſeth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth backe againe, and ſo maketh one Long Summer. 398

Experiment Solitary, touching the *Coloration* of *Blacke* and *Tawney Moores*.

THE *Heat* of the *Sunne* maketh *Men Blacke* in ſome Countries, as in *Æthiopia*, and *Ginny*, &c. *Fire* doth it not, as we ſee in *Glaſſe-Men*, that are continually about the *Fire*. The *Reaſon* may bee, becauſe *Fire* doth licke up the *Spirits*, and Bloud of the Body, ſo as they Exhale; So that it ever maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud 399

to the Outward *Parts*; And rather Concocteth it, than Soaketh it: And therefore wee see that all *Æthiops* are Fleshy, and Plumpe, and have great Lips; All which betoken *Moisture* retained, and not drawne out. Wee see also, that the *Negroes* are breed in Countries that have plenty of *water*, by *Rivers*, or otherwise: For *Meroë*, which was the *Metropolis* of *Æthiopia*, was upon a great Lake: And *Congo*, where the *Negroes* are, is full of Rivers. And the Confines of the River *Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, in so much as it is pestilent through Moisture: But the Countries of the *Abyssines*, and *Barbary*, and *Peru*, where they are Tawney, and Olivaster, and Pale, are generally more Sandy, and Dry. As for the *Æthiopes*, as they are Plumpe, and Fleshy; So (it may bee) they are Sanguine, and ruddy Coloured, if their blacke Skinne would suffer it to be seene.

Experiment Solitary touching *Motion* after the *Instant* of *Death*.

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SOme *Creatures* doe move a good while after their Head is off; As *Birds*; Some a very little time; As *Men*, and all beasts; Some move, though cut in severall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of *Death*, is the Resolution or Extinguishment of the *Spirits*; And that the Destruction or Corruption of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the Extinguishment of the Spirits doth speedily follow; But yet so, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the Heart hath beene seuered; And it is a Report also of Credit, that the *Head* of a *Pigge* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or severing it from the Marrow of the Back-bone; During which time the *Pigge* hath beene, in all appearance, starke dead, and without Motion; And after a small Time the Braine hath beene replaced, and the Skull of the *Pigge* closed, and the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* upon *Revenge* hath beene thrust forth, so as it hanged a pretty distance by the *Visuall Nerve*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beasts* are Large; And therefore, when the *Head* is off, they move little or nothing. But *Birds* have small *Heads*, and therefore the *Spirits* are a little more dispersed in the *Sinewes*, whereby Motion remaineth in them a little longer; In so much as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did Shoote a great Forked Arrow at an *Estrich*, as shee ranne swiftly upon the Stage, and strooke off her Head; And

And yet shee continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused almost all over; And therefore they move in their Severall Pieces.

NATVRALL HISTORIE.

V. Century.

WE will now enquire of *Plants* or *Vegetables*: And wee ſhall doe it with diligence. They are the principall Part of the *Third Dayes Worke*. They are the firſt *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Eſſence*; And they are of excellent and generall Vſe, for Food, Medicine, and a Number of Mechanicall Arts.

Experiment in Conſort, touching the *Acceleration* of *Germination*.

There were ſowen in a *Bed*, *Turnip-Seed*, *Radiſh-Seed*, *Wheat*, *Cucumber-Seed*, and *Peaſe*. The *Bed* wee call a *Hot-Bed*, and the Manner of it is this. There was taken *Horſe-dung*, old, and well rotted; This was laid upon a Banke, halfe a foot high, and ſupported round about with Planks; And upon the Top was caſt Sifted Earth, ſome two Fingers deepe; And then the *Seed* ſprinkled upon it, having beene ſteeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came up halfe an Inch above Ground, within two dayes after, without any Watring. The Reſt the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would have beene the ſpeedier. This is a Noble *Experiment*; For without this helpe, they would have beene

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beene foure times as long in comming up. But there doth not occurre to me, at this present, any use thereof, for profit; Except it should be for Sowing of *Pease*, which have their Price very much increased, by the early Comming. It may be tried also with *Cherries*, *Strawberries*, and other Fruit, which are dearest, when they come early.

402 There was *Wheat*, steeped in *Water* mixed with *Cow-Dung*; Other in *Water* mixed with *Horse-Dung*; Other in *Water* mixed with *Pigeon-Dung*; Other in *Vrine* of *Man*; Other in *water* mixed with *Chalke* powdred; Other in *Water* mixed with *Soot*; Other in *water* mixed with *Ashes*; Other in *water* mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmsey*; Other in *Spirit* of *Wine*. The Proportion of the Mixture was, a fourth Part of the Ingredients to the *water*; Save that there was not of the *Salt* above an eighth Part. The *Vrine*, and *Wines*, and *Spirit* of *Wine*, were Simple without Mixture of *water*. The Time of the Steeping was twelve houres. The Time of the Yeare *October*. There was also other *Wheat* sowen *unsteeped*, but *watred* twice a day with *warme water*. There was also other *Wheat* sowen *Simple* to compare it with the rest. The Event was; That those that were in the Mixture of *Dung*, and *Vrine*, and *Soot*, *Chalke*, *Ashes*, and *Salt*, came up within six daves: And those that afterwards proved the Highest, Thickest, and most Lustie, were; First the *Vrine*; And then the *Dungs*; Next the *Chalke*; Next the *Soot*; Next the *Ashes*; Next the *Salt*; Next the *Wheat Simple* of it selfe, unsteeped, and unwatered; Next the *Watered twice a day* with warme water; Next the *Claret Wine*. So that these three last were slower than the ordinary *Wheat* of it selfe; And this Culture did rather retard, than advance. As for those that were steeped in *Malmsey*, and *Spirit* of *Wine*, they came not up at all. This is a Rich *Experiment* for Profit; For the most of the Steepings are Cheape Things; And the goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming up: As it is like it will; Both being from the vigour of the *Seed*; Which also partly appeared in the Former *Experiments*, as hath beene said. This *Experiment* would be tried in other *Graines*, *Seeds*, and *Kernells*: For it may bee some *Steeping* will agree best with some *Seeds*. It would bee tried also with *Roots* steeped as before, but for *longer time*. It would bee tried also in *Severall Seasons* of the *Yeere*, especially the *Spring*.

403 *Strawberries* watered now and then, (as once in three dayes,) with *Water*, wherein hath beene steeped *Sheepes-dung*, or *Pigeons-dung*, will prevent and come early. And it is like, the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an *Experiment*, though vulgar in *Strawberries*, yet not brought into use generally: For it is usuall to helpe the Ground with Mucke; And likewise to Recomfort it sometimes with Mucke put to the Roots; But to water it with *Mucke water*, which is like to be more Forcible, is not practised.

404 *Dung*, or *Chalke*, or *Bloud*, applied in Substance, (seasonably,) to the Roots

Roots of Trees, doth set them forwards. But to doe it unto *Herbs*, without Mixture of *Water* or *Earth*, it may bee these Helpes are too Hot.

The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the Nourishment better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the experiments that follow; though they bee not Applications to the *Root*, or *Seed*. The *Planting* of *Trees* warme upon a *Wall*, against the South, or South-East Sunne, doth hasten their Comming on, and Ripening; And the South-East is found to bee better than the South West, though the South-West bee the Hotter Coast. But the cause is chiefly, for that the Heat of the Morning succeedeth the Cold of the Night: and partly, because (many times) the South-West Sunne is too Parching. So likewise the *Planting* of them upon the *Backe* of a *Chimney* where a *Fire* is kept, doth hasten their Comming on, and Ripening: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a Fire is continually kept, worketh the same Effect; Which hath beene tried with Grapes; In so much as they will come a Moneth earlier, than the Grapes abroad. 405

Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nourishment*; and *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making way* for the *Easie Comming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Removing Herbes* and *Flowers* into new Earth, once in two yeares, (which is the same thing; For the new Earth is ever looser,) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*. 406

But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske* Rose with the *Root* on, was set in a Chamber, where no Fire was, upright in an *Earthen Pan*, full of *Faire Water*, without any Mixture, halfe a foot under the *Water*, the *Standard* being more than two foot high above the *Water*: Within the Space of ten dayes, the *Standard* did put forth a faire Greene leafe, and some other little Buds, which stood at a stay, without any Shew of decay or withering, more than seven Daies. But afterwards that Leafe faded, but the young Buds did sprout on: which afterward opened into faire Leaves, in the space of three Moneths; And continued so a while after, till upon Removall wee left the Triall. But note that the *Leaves* were somewhat paler, and lighter-coloured, than the *Leaves* use to bee abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would have put forth with greater strength, and (it may bee) to have growne on to beare Flowers. By this Meanes, you may have, (as it seemeth,) *Roses* set in the middest of a *Poole*, being supported with some stay; Which is Matter of Rarenesse and Pleasure, though of small Use. This is the more 407

strange,

ſtrange, for that the like *Roſe-ſtandard* was put, at the ſame time, into *Water* mixed with *Horſe-dung*, the Horſe-dung about the fourth Part to the *Water*, and in foure Moneths ſpace (while it was obſerved) put not forth any *Leafe*, though divers *Buds* at the firſt, as the other.

408 A *Dutch Flower*, that had a *Bulbous Root*, was likewiſe put, at the ſame time, all under *Water*, ſome two or three Fingers deepe; And within ſeven dayes ſprouted, and continued long after, further Growing. There were alſo put in, a *Beet-Root*, a *Borrage-Root*, and a *Radiſh-Root*, which had all their *Leaves* cut almoſt cloſe to the *Roots*; And within ſix weekes had fa re *Leaves*; And ſo continued, till the end of *November*.

409 Note that if *Roots*, or *Peaſe*, or *Flowers*, may bee *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that thoſe Things beare when they come early: The other in the *Swiftneſſe* of their *Returnes*: For in ſome Grounds which are ſtrong, you ſhall have a *Raddiſh*, &c. come in a Month; That in other Grounds will not come in two; And ſo make double *Returnes*.

410 *Wheat* alſo was put into the *Water*, and came not forth at all; So as it ſeemeth there muſt be ſome Strength and Bulke in the Body, put into the *Water* as it is in *Roots*; For *Graines*, or *Seeds*, the Cold of the *Water* will mortifie. But caſually ſome *Wheat* lay under the Pan, which was ſomewhat moiſtned by the Suing of the Pan; which in ſix weekes (as aforeſaid) looked mouldy to the Eye, but it was ſprouted forth half a Fingers length.

411 It ſeemeth by theſe *Inſtances* of *Water*, that for Nouriſhment, the *Water*, is almoſt all in all, and that the *Earth* doth but keepe the *Plant* upright, and ſave it from Over-heat, and Over-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proveth alſo that our former *Opinion*; That Drinke incorporate with Fleſh, or Roots, (as in *Capon-Beere*, &c.) will nouriſh more eaſily, than Meat and Drinke taken ſeverally.

412 The *Houſing* of *Plants* (I conceive) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seaſons*: And as wee *Houſe Hot Countrey Plants*, as *Limons*, *Orenges*, *Myrtles*, to ſave them; So wee may *Houſe* our owne *Countrey Plants*, to forward them, and make them come in the Cold Seaſons; In ſuch ſort, that you may have *Violets*, *Strawberries*, *Peaſe*, all Winter: So that you ſow, or remove them at fit times. This *Experiment* is to be referred unto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Houſing* their *Boughes*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments in Conſort, touching the *Putting backe* or *Retardation* of *Germination*.

413 TO make *Roſes*, or other *Flowers* come late, it is an *Experiment* of Pleaſure. For the Ancients eſteemed much of *Roſa Sera*. And indeed the *November-Roſe* is the ſweeteſt, having beene leſſe exhaled by the Sunne. The Meanes are theſe. Firſt, the *Cutting off their Tops*, immediately after they have done Bearing; And then they will come againe the

the ſame yeare about *November*: But they will not come juſt on the Tops, where they were cut, but out of thoſe Shoots, which were, (as it were,) *Water-Boughes*. The *Cauſe* is, for that the Sap, which otherwiſe would have fed the Top, (though after Bearing,) will, by the diſcharge of that, divert unto the Side-Sprouts; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Roſe*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cauſe* is the ame with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the ſame Effect, in Retention of the Sap for a time, and Diverſion of it to the Sprouts, that were not ſo forward. 414

The Third is the *Cutting* off ſome few of the *Top Boughes* in the *Spring-time*, but ſuffering the lower Boughes to grow on. The *Cauſe* is, for that the Boughes doe helpe to draw up the Sap more ſtrongly; And we ſee that in Powling of Trees, many doe uſe to leave a Bough or two on the Top, to helpe to draw up the Sap. And it is reported alſo, that if you graft upon the Bough of a Tree, and cut off ſome of the old Boughes, the new Cions will periſh. 415

The Fourth is by *Laying the Roots bare about Chriſtmas*, ſome daves. The *Cauſe* is plaine, for that it doth arreſt the Sap, from going upwards, for a time; Which Arreſt is afterwards releaſed by the Covering of the Root againe with Earth; And then the Sap getteth up, but later. 416

The Fifth is the *Removing* of the *Tree*, ſome Moneth before it *Buddeth*. The *Cauſe* is, for that ſome time will be required after the *Remove*, for the Reſetling, before it can draw the Juyce: And that time being loſt, the Bloſſome muſt needs come forth later. 417

The Sixth is the *Grafting* of *Roſes* in *May*, which commonly Gardiners doe not till *July*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the ſame yeare, but late. 418

The Seventh is, the *Girding* of the *Body* of the *Tree* about with ſome Pack-threed; For that alſo, in a degree, reſtraineth the Sap, and maketh it come up, more late, and more Slowly. 419

The Eighth is, the *Planting* of them in a *Shade*, or in a *Hedge*; The *Cauſe* is, partly the Keeping out of the Sunne, which haſteneth the Sap to riſe; And partly the Robbing of them of Nouriſhment, by the Stuffe in the *Hedge*. Theſe Meanes may be practiſed upon other, both Trees, and Flowers, *Mutatis Mutandis*. 420

Men have entertained a Conceit that ſheweth prettily; Namely, that if you graft a *Late-Comming Fruit*, upon a Stocke of a *Fruit-tree* that *Commeth early*, the Graft will beare *Fruit Early*; As a Peach upon a Cherry; And contrariwiſe, if an *Early-Comming-Fruit* upon a Stocke of a *Fruit-Tree* that *Commeth late*, the Graft will beare Fruit late; As a Cherry upon a Peach. But theſe are but Imaginations, and untrue. The *Cauſe* is, for that the Cions overruleth the Stocke quite; And the Stocke is but Paſſive onely, and giveth Aliment, but no Motion to the Graft. 421

Wee

Experiments in Conſort, touching the *Melioration* of *Fruits*, *Trees*, and *Plants*.

Wee will ſpeake now, how to make *Fruits*, *Flowers*, and *Roots* larger; in more plenty; and ſweeter; than they uſe to be; And how to make the *Trees* themſelves, more Tall; more Spread; and more Haſty and Sudden; than they uſe to bee. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will ſerve much to theſe Purpoſes. And againe, that theſe *Experiments*, which we ſhall now ſet downe, doe ſerve alſo for *Acceleration*; becauſe both Effects proceed from the Encreaſe of vigour in the Tree; But yet to avoid Confuſion; And becauſe ſome of the Meanes are more proper for the one Effect, and ſome for the other, wee will handle them apart.

422 It is an aſſured Experience, that an *Heape* of *Flint*, or *Stone*, laid about the *Bottome* of a *Wilde-Tree*, (as an Oake, Elme, Aſh, &c.) upon the firſt Planting, doth make it proſper double as much, as without it. The *Cauſe* is, for that it retaineth the Moiſture, which falleth at any time upon the *Tree*, and ſuffereth it not to be exhaled by the Sunne. Againe, it keepeth the Tree warme, from Cold Blaſts and Froſts, as it were in an Houſe. It may be alſo, there is ſomewhat in the Keeping of it ſteady at the firſt. *Quære*, if Laying of Straw ſome Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giveth the Sap, yet it is the Body that draweth it. But you muſt note, that if you lay *Stones* about the ſtalke of Lettuce, or other Plants, that are more ſoft, it will over-Moiſten the Roots, ſo as the Wormes will eat them.

423 A *Tree*, at the firſt *Setting*, ſhould not bee *Shaken*, untill it hath *taken Root fully*: And therefore ſome have put two little Forkes about the Bottome of their *Trees*, to keepe them upright; But after a yeares Rooting, then Shaking doth the *Tree* good, by Looſening of the Earth, and (perhaps) by Exerciſing (as it were) and Stirring the Sap of the *Tree*.

424 Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Body*, doth make *Trees* grow high; And contrariwiſe, the *Powling* and *Cutting* of the Top, maketh them grow ſpread, and buſhy. As wee ſee in *Pollards*; &c.

425 It is reported, that to make *haſty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of ſome ſeven yeares growth; And to ſet them, not upright, but a-ſlope, a reaſonable depth under the Ground; And then, in ſtead of one Root, they will put forth many, and ſo carry more Shoots upon a Stemme.

426 When you would have *many new Roots* of *Fruit-trees*, take a *Low Tree*, and bow it, and lay all his Branches a-flat upon the Ground, and caſt Earth upon them; And every Twigge will take Root. And this is a very profitable *Experiment* for Coſtly *Trees*; (for the Boughes will make Stockes

Stocks without charge;) Such as are *Apricots*, *Peaches*, *Almonds*, *Cornelians*, *Mulberries*, *Figs*, &c. The like is continually practiſed with *Vines*, *Roſes*, *Muske-Roſes*, &c.

From *May* to *Iuly* you may take off the *Barke* of any *Bough*, being of the Bigneſſe of three or foure Inches, and cover the bare Place, ſomewhat above, and below, with Loame well tempered with Horſe-dung, binding it faſt downe. Then cut off the Bough about *Alhallontide* in the bare place, and ſet it in the Ground; And it will grow to be a faire *Tree* in one Yeare. The *Cauſe* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from deſcending towards Winter, and ſo holdeth it in the Bough; And it may be alſo that the Loame and Horſe-Dung applied to the bare place, doe moiſten it, and cheriſh it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping up the Sap of *Trees* in their Boughes; Which may ſerve to other Effects. 427

It hath beene practiſed in *Trees*, that ſhew faire, and beare not, to *Bore a Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be for that the *Tree* before had too much *Repletion*, and was oppreſſed with his owne Sap; For *Repletion* is an Enemie to Generation. 428

It hath beene practiſed in *Trees*, that doe not beare, to cleave two or three of the Chiefe Roots, and to put into the Cleft a ſmall Pebble, which may keepe it open, and then it will beare. The *Cauſe* may be, for that a Root of a Tree may be (as it were,) Hide-bound, no leſſe than the Body of the Tree; but it will not keepe open without ſomewhat put into it. 429

It is uſually practiſed, to ſet *Trees* that require much *Sunne*, upon *Walls* againſt the *South*; As *Apricots*, *Peaches*, *Plums*, *Vines*, *Figs*, and the like. It hath a double Commoditie; The one, the *Heat* of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the upper Boughes over-ſhadow the lower: But when it is ſpread upon a Wall, the Sunne commeth alike, upon the upper, and lower Branches. 430

It hath alſo beene practiſed (by ſome) to pull off ſome *Leaves* from the *Trees* ſo *ſpread*, that the Sunne may come upon the *Bough* and *Fruit* the better. There hath beene practiſed alſo a Curioſitie, to ſet a *Tree* upon the *North-Side* of a Wall, and at a little height, to draw him thorow the Wall, and ſpread him upon the *South-Side*: Conceiving that the Root and lower Part of the Stocke ſhould enjoy the Freſhneſſe of the Shade; And the Upper Boughes, and Fruit, the Comfort of the Sunne. But it ſorted not; The *Cauſe* is, for that the *Root* requireth ſome Comfort from the Sunne, though under Earth, as well as the *Bodie*: And the Lower Part of the Bodie more than the Upper, as wee ſee in Compaſſing a *Tree* below with ſtraw. 431

The *Lowneſſe* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you ſhall ever ſee in *Apricots*, *Peaches*, 432

Peaches, or *Melo-Cotones*, upon a wall, the greateſt Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow upon low Vines, bound to ſmall Stakes. And the raiſed Vines in Arbours make but Verjuyce. It is true, that in *Italy*, and other *Countries*, where they have hotter Sunne, they raiſe them upon *Elmes*, and Trees; But I conceive, that if the *French* Manner of Planting low, were brought in uſe there, their *Wines* would be ſtronger and ſweeter. But it is more chargeable in reſpect of the Props. It were good to trie whether a *Tree* grafted ſomewhat neare the Ground, and the lower boughes onely maintained, and the higher continually proined off, would not make a larger *Fruit*.

433 To have *Fruit* in *Greater Plentie*, the way is, to graft, not onely upon young *Stockes*, but upon divers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but upon one Stocke, the *Tree* can beare but few.

434 The *Digging* yearely about the *Roots* of *Trees*, which is a great meanes, both to the *Acceleration* and *Melioration* of *Fruits*, is practiſed in nothing but in *Vines*; Which if it were transferred unto other *Trees*, and *Shrubs*, (as *Roſes*, &c. I conceive would advance them likewiſe.

435 It hath beene knowne, that a *Fruit-Tree* hath beene blowne up (almoſt) by the Roots, and ſet up againe, and the next yeare bare exceedingly. The *Cauſe* of this, was nothing but the *Looſening* of the *Earth*, which comforteth any *Tree*, and is fit to be practiſed, more than it is, in *Fruit-Trees*: For *Trees* cannot be ſo fitly removed into New Grounds, as *Flowers* and *Herbs* may.

436 To revive an *Old Tree*, the Digging of it about the *Roots*, and Applying new Mould to the Roots, is the way. We ſee alſo that *Draught-Oxen*, put into freſh Paſture, gather new and tender Fleſh; And in all Things, better Nouriſhment than hath beene uſed, doth help to renew; Eſpecially, if it be not onely better, but changed, and differing from the former.

437 If an *Herb* be cut off from the *Roots*, in the beginning of Winter, and then the Earth be trodden and beaten downe hard, with the Foot and Spade, the *Roots* will become of verie great Magnitude in Summer. The Reaſon is, for that the Moiſture being forbidden to come up in the Plant, ſtayeth longer in the Root, and ſo dilateth it. And *Gardiners* uſe to tread downe any looſe Ground, after they have ſowne *Onions*, or *Turnips*, &c.

438 If *Panicum* be laid below, and about the Bottome of a *Root*, it will cauſe the Root to grow to an Exceſſive Bigneſſe. The *Cauſe* is, for that being it ſelfe of a Spungie Subſtance, it draweth the Moiſture of the Earth to it, and ſo feedeth the Root. This is of greateſt uſe for *Onions*, *Turnips*, *Parſnips*, and *Carrets*.

439 The *Shifting* of *Ground* is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things doe proſper beſt, when they are advanced to the better: Your *Nurſerie* of *Stocks* ought to be in a more Barren

Barren Ground, than the Ground is whereunto you remove them. So all *Graſiers* preferre their Cattell from meaner Paſtures to better. We ſee alſo, that Hardneſſe in Youth lengthneth Life, becauſe it leaveth a Cheriſhing to the better, of the Body, in Age: Nay in Exerciſes, it is good to begin with the hardeſt, as Dancing in Thicke Shooes &c.

It hath beene obſerved, that *Hacking* of *Trees* in their *Barke*, both 440
downe-right, and acroſſe, ſo as you make them rather in ſlices, than in continued Hacks, doth great good to *Trees*; And eſpecially deliver-eth them from being *Hide-bound*, and killeth their Moſſe.

Shade to ſome *Plants* conduceth to make them large, and proſperous, 441
more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongſt *Strawberries*, ſow here and there ſome *Borrage-Seed*; And you ſhall finde the *Strawberries* under thoſe Leaves farre more large than their Fellowes. And *Bayes* you muſt plant to the *North*; Or defend them from the *Sunne* by a Hedge-Row; And when you ſow the *Berries*, weed not the *Borders*, for the firſt halfe yeare; For the *Weed* giveth them *Shade*.

To increaſe the *Crops* of *Plants*, there would be conſidered, not onely 442
the *Increaſing* the *Luſt* of the *Earth*, or of the *Plant*, but the Saving alſo of that which is ſpilt. So they have lately made a Triall, to *Set Wheat*; which nevertheleſſe hath beene left off, becauſe of the trouble and paines; Yet ſo much is true, that there is much ſaved by the *Setting*, in compariſon of that which is *Sowen*; Both by keeping it from being picked up by Birds; And by Avoiding the Shallow lying of it, whereby much that is ſowen taketh no Root.

It is preſcribed by ſome of the *Ancients*, that you take *Small Trees*, 443
upon which *Figs* or other *Fruit* grow, being yet unripe, and cover the *Trees* in the Middle of *Autumne* with dung, untill the Spring; And then take them up in a warme day, and replant them in good Ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the ſame kinde, doe but bloſſome. But this ſeemeth to have no great Probabilitie.

It is reported, that if you take *Nitre*, and mingle it with *Water*, to the 444
thickneſſe of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will ſprout forth within eight dayes. The *Cauſe* is like to be, (if the *Experiment* be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*.

Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Orenges*; Or a *Peach*, or a 445
Plum-Stone, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come up much earlier than in the *Earth* it ſelfe. This I conceive to be as a Kinde of *Grafting* in the *Root*; For as the Stocke of a Graft yeeldeth better prepared Nouriſhment to the Graft, than the Crude Earth; So the *Squill* doth the like to the *Seed*. And I ſuppoſe the ſame would be done, by *Putting Kernells* into a *Turnip*, or the

the like; Save that the *Squill* is more Vigorous, and Hot. It may be tried also, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in severall places, when it is almost at his Bigneſſe, and before it ripeneth, hath beene practiſed with ſucceſſe, to ripen the Fruit more ſuddenly. Wee ſee the Example of the *Biting* of *Waſpes*, or *Wormes*, upon *Fruit*, whereby it (manifeſtly) ripeneth the ſooner.

447 It is reported, that *Alga Marina* (*Sea-weed*) put under the *Roots* of *Coleworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Help to Fertilitie.

448 It hath beene practiſed, to cut off the Stalks of *Cucumbers*, immediately after their *Bearing*, cloſe by the Earth; And then to caſt a prettie Quantitie of Earth upon the *Plant* that remaineth; and they will beare the next yeare Fruit, long before the ordinarie time. The *Cauſe* may be, for that the Sap goeth downe the ſooner, and is not ſpent in the Stalke or Leafe, which remaineth after the Fruit. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annuall*, ſeemeth to be partly cauſed by the Over-Expence of the Sap into Stalke, and Leaves; which being prevented, they will ſuper-annate, if they ſtand warme.

449 The *Pulling off* many of the *Bloſſomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cauſe* is manifeſt; For that the Sap hath the leſſe to nourish. And it is a Common Experience, that if you doe not pull off ſome *Bloſſomes*, the firſt time a *Tree* bloometh, it will bloſſome it ſelfe to death.

450 It were good to trie, what would be the Effect, if all the *Bloſſomes* were pulled from a *Fruit-Tree*; Or the *Acornes* and *Cheſnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I ſuppoſe that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit*; Or elſe, the ſame yeares, larger Leaves, becauſe of the Sap ſtored up.

451 It hath beene generally received, that a *Plant watered* with *Warme Water*, will come up ſooner and better, than with Cold Water, or with Showers. But our *Experiment* of *Watering Wheat* with *Warme Water* (as hath beene ſaid) ſucceeded not; which may be, becauſe the Triall was too late in the Yeare, *viz.* in the End of *October*. For the Cold then comming upon the *Seed*, after it was made more tender by the Warme Water, might check it.

452 There is no doubt, but that *Grafting* (for the moſt Part) doth *meliorate* the *Fruit*. The *Cauſe* is manifeſt; For that the Nouriſhment is better prepared in the *Stocke*, than in the *Crude Earth*: But yet note well, that there be ſome *Trees*, that are ſaid to come up more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cauſe* I ſuppoſe to be, for that thoſe *Plants* require a Nourſhment of great Moiſture; And though the Nouriſhment of the *Stocke* be finer, and

and better prepared, yet it is not ſo moiſt, and plentifull, as the Nouriſhment of the *Earth*. And indeed wee ſee thoſe *Fruits* are verie Cold *Fruits* in their Nature.

453 It hath beene received, that a Smaller *Peare*, grafted upon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* upon the *Late Stocke*; And *è converſo*; which we rejected before: For the *Cions* will governe. Nevertheleſſe it is probable enough, that if you can get a *Cions* to grow upon a *Stocke* of another kinde, that is much moyſter than his owne *Stocke*, it may make the *Fruit* Greater, becauſe it will yeeld more plentifull nouriſhment; Though it is like it will make the *Fruit* Baſer. But generally, the *Grafting* is upon a drier *Stock*; As the *Apple* upon a *Crab*; The *Peare* upon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* upon the *Stocke* of a *Colewort*, and it will beare a great flaggie *Apple*; The *Kernell* of which, if it be ſet, will be a *Colewort*, and not an *Apple*. It were good to trie, whether an *Apple-Cions* will proſper, if it be grafted upon a *Sallow*, or upon a *Poplar*, or upon an *Alder*, or upon an *Elme*, or upon an *Horſe-Plumme*, which are the moyſteſt of *Trees*. I have heard that it hath beene tried upon an *Elme*, and ſucceeded.

454 It is manifeſt by Experience, that *Flowers* Removed wax greater, becauſe the Nouriſhment is more eaſily come by, in the looſe Earth. It may be, that Oft Regrafting of the ſame Cions, may likewiſe make *Fruit* greater; As if you take a *Cions*, and graffit upon a *Stocke* the firſt yeare; And then cut it off, and graft it upon another *Stocke* the ſecond yeare; and ſo for a third; Or fourth yeare; And then let it reſt, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting *there are many* Experiments *worth the Noting, but thoſe wee reſerve to a proper Place.*

455 It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaves, have his Top cut off. The *Cauſe* is plaine, for that the Sap hath the leſſe to feed, and the leſſe way to mount: But it may be, the *Figge* will come ſomewhat later, as was formerly touched. The ſame may be tried likewiſe in other *Trees*.

456 It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Trunke* of the *Tree* thorow, in ſeverall places, and thruſt into the Place bored, Wedges of ſome Hot *Trees*, as *Turpentine*, *Maſtick-tree*, *Guaiacum*, *Iuniper*, &c. The *Cauſe* may be, for that Adventive Heat doth cherish up the Native Iuyce of the *Tree*.

457 It is reported, that *Trees* will grow greater, and beare better *Fruit*; if you put *Salt*, or *Lees of Wine*, or *Blood* to the *Roots*. The *Cauſe* may be the Encreaſing the Luſt or Spirit of the *Root*; Theſe Things being more forcible, than ordinarie *Compoſts*.

458 It is reported by one of the Ancients, that *Artichoakes* will be leſſe prickly, and more tender, if the *Seeds* have their Tops pulled, or grated off upon a Stone.

459 *Herbs* will be tenderer, and fairer; if you take them out of *Beds*, when they are newly come up, and remove them into *Pots*, with better *Earth*. The Remove from *Bed* to *Bed* was spoken of before; But that was in severall yeares; This is upon the sudden. The *Cause* is the same with other *Removes*, formerly mentioned.

460 *Coleworts* are reported by one of the *Ancients*, to prosper exceedingly, and to be better tasted, if they be sometimes watred with *Salt-Water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is lesse Adurent than *Salt*.

461 It is reported, that *Cucumbers* will prove more Tender, and Daintie, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cause* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the grosser Iuyce of the Earth, but onely the finer. The same *Experiment* may be made in *Artichoakes*, and other *Seeds*, when you would take away, either their Flashinesse, or Bitternesse. They speake also, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that seemeth to me not so probable, because *Honey* hath too quicke a Spirit.

462 It is reported that *Cucumbers* will be lesse *Watrie*, and more *Melonlike*, if in the Pit where you set them, you fill it (halfe way up) with *Chaffe*, or small *Sticks*, and then powre *Earth* upon them; For *Cucumbers*, as it seemeth, doe extremely affect Moisture; And over-drinke themselves; Which this *Chaffe*, or *Chips*, forbiddeth. Nay it is further reported, that if, when a *Cucumber* is growne, you set a Pot of water about five or six inches distance from it, it will, in 24. houres, shoot so much out, as to touch the Pot; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it discovereth *Perception* in *Plants*, to move towards that which should help and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is far more strange: It is, that if you set a Stake, or Prop, some distance from it, it will grow that way; Which is farre stranger (as is said) than the other; For that it may worke by a *Sympathy* of *Attraction*: But this of the *Stake* seemeth to be a Reasonable Discourse.

463 It hath beene touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receive Aliment sufficient; And yet no more than they can well turne, and digest; And withall doe sweat out the coursest and unprofitable Iuyce; Even as it is in *Living Creatures*, which by Moderate Feeding, and Exercise, and Sweat, attaine the soundest Habite of Body.

464 As *Terebration* doth *Meliorate Fruit*, so, upon the like reason, doth *Letting of Plants Blood*; As *Pricking Vines*, or other *Trees*, after they be of some Growth; And thereby letting forth *Gumme*, or *Teares*; Though this be not to continue, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, *Bitter Almonds* have beene turned into *Sweet*.

The

The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-Dung* above all other *Dung*; Which may be, because of the Moisture of that Beast, whereby the *Excrement* hath lesse Acrimony; For wee see *Swines* and *Pigges* Flesh is the Moistest of Fleshes. 465

It is observed by some, that all *Herbs* wax sweeter, both in Smell and Taste, if after they be growne up some reasonable time, they be cut, and so you take the latter Sprout. The *Cause* may be for that the longer the Iuyce stayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Causes, why *Graines*, *Seeds*, and *Fruits*, are more Nourishing than *Leaves*, is the length of time, in which they grow to *Maturation*. It were not amisse to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing. 466

As *Grafting* doth generally advance and *Meliorate Fruits*, above that which they would be, if they were set of *Kernells*, or *Stones*, in regard the *Nourishment* is better concocted; So (no doubt) even in *Grafting*, for the same cause, the Choyse of the *Stocke* doth much; Alwayes provided, that it be somewhat inferiour to the *Cions*: For otherwise it dulleth it. They commend much the *Grafting* of *Peares*, or *Apples*, upon a *Quince*. 467

Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tried, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (especially laid up together for a Moneth to rot,) is a verie great Nourisher, and Comforter to a *Fruit-Tree*. 468

It is delivered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twentie dayes, and then set againe; And yet more, if the outermost Pill be taken off all over. 469

It is delivered by some, that if one take the *Bough* of a *Low Fruit-tree*, newly budded, and draw it gently, without hurting it, into an *Earthen* Pot perforate at the bottome to let in the *Plant*, and then Cover the *Pot* with Earth, it will yeeld a verie large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Removing, and Leaving the *Fruit* in the Earth. The like, (they say,) will be effected, by an Emptie *Pot* without Earth in it, put over a *Fruit*, being propped up with a *Stake*, as it hangeth upon the *Tree*; And the better, if some few Pertusions be made in the *Pot*. Wherein, besides the Defending of the *Fruit*, from Extremitie of Sunne or Weather, some give a reason, that the *Fruit*, Loving and Coveting the open Aire and Sunne, is invited by those Pertusions, to spread and approch, as neare the open Aire, as it can; And so enlargeth in *Magnitude*. 470

All *Trees*, in *High* and *Sandy Grounds*, are to be set deepe; And in *Watry Grounds*, more shallow. And in all *Trees*, when they be removed (especially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* be coasted, (*North* and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that 471

seemeth

seemeth to have lesse reason; Because the *Stone* lyeth not so neare the Sunne, as the *Tree* groweth.

472 *Timber Trees* in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot up still in Height; And chiefly because they are defended from too much Sun and Wind, which doe checke the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set upon a *Wall*, against the Sunne, betweene Elbowes or Buttresses of Stone, ripen more, than upon a Plaine Wall.

473 It is said, that if *Fotado Roots*, be set in a *Pot* filled with Earth, and then the *Pot* with Earth be set likewise within the Ground, some two or three Inches, the *Roots* will grow greater, than Ordinarie. The *Cause* may be, for that Having Earth enough within the *Pot* to nourish them; And then being stopped by the Bottom of the *Pot* from putting Strings downward, they must needs grow greater in Breadth, and Thicknesse. And it may be, that all *Seeds* or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

474 The *Cutting off* the *Leaves* of *Radish*, or other *Roots*, in the beginning of Winter, before they withen; And Covering againe the *Root*, something high with Earth; Will preserve the *Root* all Winter, and make it bigger, in the Spring following, as hath beene partly touched before. So that there is a double Use of this *Cutting off* the *Leaves*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Roots* greater. And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthning the *Root*, it will make the *Fruit* also greater.

475 It is an *Experiment* of great pleasure, to make the *Leaves* of *Shadie Trees*, larger than ordinarie. It hath beene tried (for certaine) that a *Cion* of a *Weech Elme*, grafted upon the Stocke of an Ordinarie *Elme*, will put forth Leaves almost as broad as the Brimme of ones Hat. And it is verie likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaves*. It would be tried therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the Leafe.

476 The *Barrennesse* of *Trees*, by *Accident*, (besides the *Weaknesse* of the *Soile*, *Seed*, or *Roote*. And the *Injurie* of the *Weather*) commeth either of their *Over-bearing* with *Mosse*; Or their being *Hide-bound*; Or their *Planting too deepe*; Or of *Ebbing* of the *Sap too much into the Leaves*. For all these three are *Remedies* mentioned before.

Experiments in Consort touching *Compound Fruits* and *Flowers*.

We see that in *Living Creatures*, that have *Male* and *Female*, there is Copulation of severall Kindes; and so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Asse*; And some other *Compounds*, which we call *Monsters*,

sters, though more rare: And it is held, that that *Proverbe*, *Africa semper aliquid Monstri parit*; commeth, for that the Fountaines of Waters there, being rare, divers Sorts of Beasts come from severall Parts to drinke; And so being refreshed, fall to couple, and many times with severall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; Which nevertheless, if it be possible, is more at command, than that of *living Creatures*; For that their Lust requireth a voluntarie Motion: wherefore it were One of the most Noble *Experiments* touching *Plants*, to finde it out: For so you may have great Varietie of New *Fruits*, and *Flowers* yet unknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kinde*. For the *Cions* ever-over-ruleth the *Stocke*.

It hath beene set downe by one of the *Ancients*, that if you take two *Twigs* of severall *Fruit Trees*, and flat them on the Sides, and then binde them close together, and set them in the ground, they will come up in one Stock; But yet they will put forth their severall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnitie* of *Continuance*, is easier to procure, than *Vnitie* of *Species*. It is reported also that *Vines* of *Red* and *White Grapes*, being set in the Ground, and the upper Parts being platted, and bound close together, will put forth *Grapes* of the severall Colours, upon the same Branch; And *Grape-Stones* of severall Colours within the same *Grape*: But the more, after a yeare or two; The Unitie (as it seemeth) growing more Perfect. And this will likewise help, if from the first *Vniting*, they be often Watred; For all Moisture helpeth to *Vnion*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke*; At the least for a time. 477

They report, that divers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put up *Plants Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth. 478

It is reported, that young *Trees* of severall kindes, set contiguous, without any binding, and verie often Watred, in a *Fruitfull Ground*, with the verie Luxurie of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath beene propounded; For that the *Binding* doth hinder the Naturall Swelling of the *Tree*; which, while it is in Motion, doth better *unite*. 479

There are many Ancient and Received Traditions and Observations, touching the *Sympathy* & *Antipathy* of *Plants*; For

Experiments in Consort touching the *Sympathy* and *Antipathy* of *Plants*.

For that ſome will thrive beſt ... wing neere others; which they impute to *Sympathy*: ... ne worſe; which they impute to *Antipathy*. But theſe are ... and Ignorant Conceits; And forſake the true *Indication* ... ne *Cauſes*; As the moſt Part of *Experiments*, that concern ... *ympathies* and *Antipathies* doe. For as to *Plants*, neither is there any ſuch Secret *Friendſhip*, or *Hatred*, as they imagine; And if we ſhould be content to call it *Sympathy*, and *Antipathy*, it is utterly miſtaken: For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Whereſoever one *Plant* draweth ſuch a particular Iuyce out of the Earth; as it qualifieth the Earth; So as that Iuyce which remaineth is fit for the other Plant, there the Neighbourhood doth good; Becauſe the Nouriſhments are contrarie, or ſeverall: But where two *Plants* draw (much) the ſame Iuyce, there the Neighbourhood hurteth; For the one deceiveth the other.

480 First therefore, all *Plants* that doe draw much *Nouriſhment* from the *Earth*, and ſo ſoake the Earth, and exhauſt it; hurt all Things that grow by them; As Great *Trees*, (eſpecially *Aſhes*,) and ſuch *Trees*, as ſpread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently received) to the *Vine* only; But it is an Enemie to any other *Plant*; Becauſe it draweth ſtrongly the fatteſt Iuyce of the Earth. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne away; This may be, becauſe there it findeth worſe Nouriſhment; For though the *Root* be ... ere it was, yet (I doubt) the *Plant* will bend as it nouriſheth.

481 Where *Plants* are of ſeverall Natures, and draw ſeverall Iuyces out of the Earth, there (as hath beene ſaid) the One ſet by the other helpeth: As it is ſet downe by divers of the Ancients, that *Rew* doth proſper much, and becommeth ſtronger, if it be ſet by a *Figge-Tree*: which (we conceive) is cauſed, Not by Reaſon of *Frindſhip*, but by *Extraction* of a Contrarie Iuyce: The one Drawing *Iuyce* fit to reſult Sweet, the other bitter. So they have ſet downe likewiſe, that a *Roſe* ſet by *Garlick* is ſweeter: Which likewiſe may be, becauſe the more Fetide Iuyce of the Earth goeth into the *Garlick*; And the more Odorate into the *Roſe*.

482 This wee ſee manifeſtly, that there be certaine *Corne-Flowers*, which come ſeldome or never in other places, unleſſe they be ſet; But onely amongſt Corne: As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitorie*. Neither can this be, by Reaſon of the Culture of the Ground, by Plowing, or Furrowing; As ſome *Herbs*, and *Flowers*, will grow but in *Ditches* new Caſt; For if the *Ground* lie fallow, and unſowne, they will not come: So as it ſhould ſeeme to be the *Corne*, that

that qualifieth the Earth, and prepareth it for their Growth.

This Obſervation, if it holdeth, (as it is verie probable,) is of great uſe, for the *Meliorating* of *Taſte* in *Fruits*, and *Eſculent Herbs*; And of the *Sent* of *Flowers*. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more ſtrong, and bitter, (as the Ancients have noted,) good ſtore of *Rew* planted about the *Figge-Tree*, will make the *Figge* more ſweet. Now the *Taſtes* that doe moſt offend in *Fruits*, and *Herbs*, and *Roots*, are *Bitter*; *Harriſh*, *Sowre*; And *Watriſh*, or *Flaſhie*. It were good therefore to make the *Trials* following. 483

Take *Wormewood*, or *Rew*, and ſet it neere *Lettuce*, or *Coleflorie*, or *Artichoake*; And ſee whether the *Lettuce*, or the *Coleflorie*, &c. become not the ſweeter. 484

Take a *Service-Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which we know have *Fruits* of harſh and binding Iuyce, and ſet them neere a *Vine*, or *Figge-Tree*, & ſee whether the *Grapes*, or *Figs*, will not be the ſweeter. 485

Take *Cucumbers*, or *Pumpions*, and ſet them (here and there) amongſt *Muske-Melons*, and ſee whether the *Melons* will not be more Winy, and better taſted. Set *Cucumbers* (likewiſe) amongſt *Radiſh*, and ſee whether the *Radiſh* will not be made the more Biting. 486

Take *Sorrell*, and ſet it amongſt *Raſps*, and ſee whether the *Raſps* will not be the ſweeter. 487

Take *Common Briar*, and ſet it amongſt *Violets*, or *Wall-Flowers*, and ſee whether it will not make the *Violets*, or *Wall-Flowers* ſweeter, and leſſe Earthy in their Smell. So ſet *Lettuce*, or *Cucumbers*, amongſt *Roſemary*, or *Bayes*, and ſee whether the *Roſemary*, or *Bayes*, will not be the more Odorate, or Aromaticall. 488

Contrariwiſe, you muſt take heed, how you ſet *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Roſemary* will leeſe in Sweetneſſe, if it be ſet with *Lavender*, or *Bayes*, or the like. But yet, if you will correct the ſtrength of an Herb, you ſhall doe well to ſet other like Herbs by him, to take him downe; And if you ſhould ſet *Tanſey* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you ſhould ſet *Rew* by *Common Wormewood*, it may be, the *Wormewood* would turne to be liker *Roman Wormewood*. 489

This *Axiome* is of large extent; And therefore would be ſevered, and refined by *Triall*. Neither muſt you expect to have a *Groſſe Difference* by this kinde of Culture, but only *Further Perfection*. 490

Triall would be alſo made in *Herbs Poyſonous*, and *Purgative*, whoſe ill Qualitie (perhaps) may be diſcharged, or attempred, by Setting ſtronger *Poyſons*, or *Purgatives*, by them. 491

It is reported, that the *Shrub* called *Our Ladies Seale*; (which is a Kinde of *Briony*,) and *Coleworts*, ſet neere together, one or both will die. The *Cauſe* is, for that they be both great Depredatours of the Earth, and one of them ſtarveth the other. The like is ſaid of a *Reed*, and a *Brake*; Both which are ſucculent; And therefore the One deceiveth 492

ceiveth the Other. And the like of *Hemlock* and *Rew*; Both which draw ſtrong Iuyces.

493 Some of the Ancients, and likewiſe divers of the Moderne Writers, that have laboured in *Naturall Magick*, have noted a *Sympathy*, between the *Sunne*, *Moone*, and ſome Principall *Starres*; And certaine *Herbs*, and *Plants*. And ſo they have denominated ſome *Herbs Solar*, and ſome *Lunar*; And ſuch like Toyes put into great Words. It is manifeſt, that there are ſome *Flowers*, that have *Reſpect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed moſt *Flowers*, doe open or ſpread their Leaves abroad, when the *Sunne* ſhineth ſerene and faire: And againe, (in ſome part,) cloſe them, or gather them inward, either towards Night, or when the Skie is overcaſt. Of this there needeth no ſuch Solemne Reaſon to be aſſigned; As to ſay, that they rejoyce at the preſence of the Sunne; And mourne at the Abſence thereof. For it is Nothing elſe, but a little Loading of the Leaves, and Swelling them at the Bottome, with the Moiſture of the Aire; whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Clover* will hide the *Stalke*, when the *Sunne* ſheweth bright; Which is Nothing, but a full Expanſion of the leaves. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mary-golds*; *Wart-wort*; *Mallow Flowers*; and others. The *Cauſe* is ſomewhat more Obſcure than the former; But I take it to be no other, but that the Part againſt which the *Sunne* beateth, waxeth more faint and flaccide in the Stalke, And thereby leſſe able to ſupport the *Flower*.

494 What a little *Moiſture* will doe in *Vegetables*, even though they be dead, and ſevered from the Earth, appeareth well in the *Experiment* of *Inglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the Bottom, and one ſmooth entire Straw at the Top. They take onely the Part that is Wreathed, and cut off the other, leaving the *Beard* halfe the Breadth of a finger in length. Then they make a little *Croſſe* of a *Quill*, long-wayes of that Part of the *Quill*, which hath the Pith; And Croſſe-wayes of that Peece of the *Quill* without Pith; The whole *Croſſe* being the Breadth of a Finger high. Then they pricke the Bottome where the *Pith* is, and thereinto they put the *Oaten-beard*, leaving halfe of it ſticking forth of the *Quill*: Then they take a little white Box of wood, to deceive Men, as if ſomewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Croſſe* ſinke downe, but to ſticke. Then likewiſe by way of Impoſture, they make a Queſtion; As, Who is the Faireſt Woman in the Company? Or, Who hath a Glove, or Card? And cauſe Another to name divers Perſons: And upon everie Naming, they ſticke the *Croſſe* in the Box, having firſt put it towards their Mouth, as if they charmed it; And the *Croſſe* ſtirreth not; But when they come to the Perſon that they would take; As they hold the *Croſſe* to their Mouth, they touch the *Beard* with the Tip of their Tongue, and wet it; And ſo ſticke the *Croſſe* in the Box; And then you ſhall ſee it turne finely and ſoftly, three or foure Turnes; Which is cauſed by the untwining of the *Beard* by the Moiſture. You may ſee it more evidently, if you ſticke the Croſſe betweene your fingers, in ſtead of the Box; And therefore you may ſee, that this Motion, which is Effected by ſo little Wet, is ſtronger than the Cloſing or Bending of the Head of a *Marigold*.

495 It is reported by ſome, that the *Herb* called *Roſa-Solis*, (whereof they make Strong Waters,) will at the Noone-day, when the *Sunne* ſhineth hot and bright, have a great Dew upon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the Sunne. Men favour Wonders. It were good firſt to be ſure, that the Dew that is found upon it, bee not the Dew of the Morning Preſerved, when the Dew of other *Herbs* is breathed away; for it hath a ſmooth and thicke Leafe, that doth not diſcharge the Dew ſo ſoone, as other *Herbs* that are more Spungy and Porous. And it may bee Purſlane, or ſome other Herb, doth the like, and is not marked. But if it bee ſo, that it hath more Dew at Noone, than in the Morning, then ſure it ſeemeth to be an Exudation of the *Herb* it ſelfe. As Plums ſweat when they are ſet into the Oven; for you will not (I hope) thinke, that it is like *Gedeons Fleece* of *Wooll*, that the *Dew* ſhould fall upon that, and no where elſe.

496 It is certaine, that the *Honey-dewes*, are found more upon *Oake-leaves*, than upon *Aſh*, or *Beech*, or the like: But whether any *Cauſe* be, from the *Leafe* it ſelfe, to concoct the Dew; Or whether it bee onely, that the *Leafe* is Cloſe and Smooth; (And therefore drinketh not in the Dew, but preſerveth it;) may be doubted. It would be well inquired, whether *Manna* the *Drug*, doth fall but upon certaine *Herbs* or *Leaves* onely. *Flowers* that have deepe *Sockets*, do gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the *Dew*.

497 The Experience is, that the *Froth*, which they call *Woodeſare*, (being like a kinde of Spittle,) is found but upon certaine *Herbs*, and thoſe Hot Ones; As *Lavender*, *Lavender-cotton*, *Sage*, *Hiſſope*, &c. Of the *Cauſe* of this enquire further; For it ſeemeth a Secret. There falleth alſo *Mildew* upon *Corne*, and ſmutteth it; But it may bee, that the ſame falleth alſo upon other *Herbs*, and is not obſerved.

498 It were good, Triall were made, whether the great Conſent betweene *Plants* and *Water*, which is a principall Nouriſhment of them, will make an *Attraction* or Diſtance, and not at Touch only. Therefore take a *Veſſell*, and in the middle of it make a falſe Bottome of courſe Canvaſſe: Fill it with Earth above the Canvaſſe, and let not the Earth bee watred; Then ſow ſome good *Seeds* in that Earth; But under the Canvaſſe, ſome halfe a foot in the Bottome of the Veſſell, lay a great *Spunge*, thorowly wet in water; And let it lye ſo ſome ten Dayes; And ſee

see whether the *Seed* will sprout, and the *Earth* become more Moist, & the *Sponge* more dry. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is far stranger than this.

Experiments in Consort, touching the *Making Herbs* and *Fruit*, *Medicinable*.

499

THe *Alteration* of the *Scent*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herb*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance; are but *Fancies*. The *Cause* is, for that those Things have passed their Period, and nourish not. And all *Alteration* of Vegetables, in those Qualities, must be by somewhat, that is put to goe into the Nourishment of the *Plant*. But this is true; that where Kine feed upon *Wilde Garlicke*, their *Milke* tasteth plainly of that *Garlicke*. And the Flesh of *Muttons* is better tasted where the *Sheepe* feed upon *Wilde Thyme*, and other wholesome *Herbs*: *Galen* also speaketh of the Curing of the *Kirrus* of the *Liver*, by *Milke* of a *Cow*, that feedeth but upon certain *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rosemary*, *Orange*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Mayden* that was fed with *Napellus*; (which is counted the Strongest Poyson of all *Vegetables*;) which with use did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is observed by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth upon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleys, wherein no such *Herbs* are. Thus far I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; and likewise Bread tempred with divers Powders; So of *Meat* also, (as *Flesh*, *Fish*, *Milke*, and *Eggs*;) that they may bee made of great use for *Medicine*, and *Diet*, if the *Beast*, *Foule*, or *Fish*, be fed with a speciall kinde of food, fit for the Disease. It were a dangerous Thing also for secret Empoysonments. But whether it may be applyed unto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Juyce; which is hardly capable of any speciall Quality, untill the *Plant* doe assimilate it.

500

But lest our Incredulity may prejudice any profitable Operations in this kind, (especially since Many of the Ancients have set them down,) We thinke good briefly to propound the foure *Meanes*, which they have devised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it up againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified: And besides, it is a long time in Going up, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*: Which is somewhat better: For if any Vertue bee received from the *Medicine*, it hath the lesse way, and the lesse time, to goe up. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, wherein

in the *Medicine* is *Infused*: Which I have little Opinion of, because the *Seed*, (I doubt,) will not draw the Parts of the *Matter*, which have the *Propriety*: But it will bee farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watering* of the *Plant oft*, with an *Infusion* of the *Medicine*. This, in one respect, may have more force than the rest; Because the *Medication* is oft renewed; Whereas the rest are applyed but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborne to receive those fine *Impressions*; And besides, (as I said before,) they have a great *Hill* to goe up. I judge therefore the likeliest way to bee the *Perforation* of the *Body* of the *Tree*, in *severall places*, *one above the other*; And the *Filling* of the *Holes* with *Dung mingled with the Medicine*. And the *Watring* of those *Lumps* of *Dung*, with Squirts of an *Infusion* of the *Medicine* in *Dunged water*, once in three or foure Daies.

NATVRALL HISTORIE.

VI. Century.

OVR *Experiments* we take care to be, (as we have often ſaid,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vſe*, or of *Diſcovery*: For wee hate *Impoſtures*; And deſpiſe *Curioſities*. Yet becauſe wee muſt apply our Selves ſomwhat to Others, wee will ſet downe ſome *Curioſities* touching *Plants*.

Experiments in Conſort, touching *Curioſities* about *Fruits*, and *Plants*.

501 It is a *Curioſity*, to have *ſeverall Fruits* upon *one Tree*; And the more, when ſome of them come *Earely*, and ſome come *Late*; So that you may have, upon the ſame *Tree*, Ripe *Fruits* all Sommer. This is eaſily done, by Grafting of ſeverall *Cions*, upon ſeverall Boughes, of a Stock, in a good Ground, plentifully fed. So you may have all Kindes of *Cherries*, and all kindes of *Plums*, and *Peaches*, and *Apricots*, upon one *Tree*; But I conceive the *Diverſity* of *Fruits* muſt be ſuch, as will graft upon the ſame Stocke. And therefore I doubt, whether you can have *Apples*, or *Peares*, or *Orenges*, upon the ſame Stocke, upon which you graft *Plummes*.

502 It is a *Curioſity* to have *Fruits* of *Divers Shapes*, and *Figures*. This is eaſily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may have *Cucumbers*, &c. as Long

as a Cane; Or as round as a Spheare; Or formed like a Croſſe. You may have alſo *Apples*, in the forme of *Peares*, or *Limons*. You may have alſo *Fruit* in more Accurate Figures; As we ſaid of *Men*, *Beaſts*, or *Birds*, according as you make the Moulds. Wherein you muſt underſtand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greateſt: For elſe you will choake the Spreading of the *Fruit*; Which otherwiſe would ſpread it ſelfe, and fill the Concave, and ſo bee turned into the *Shape* deſired; As it is in Mould workes of Liquid Things. Some doubt may bee conceived, that the Keeping off the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Covered. *Quære* alſo, whether ſome ſmall Holes, may not be made in the Wood, to let in the Sunne. And note, that it were beſt to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curioſity*, to have *Inſcriptions*, or *Engravings*, in *Fruit*, or *Trees*. This is eaſily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, ſo the Letters will grow more large, and Graphicall.

——Teneriſq; meos incidere Amores
Arboribus, creſcent illæ, creſcetis Amores.

504 You may have *Trees apparrelled* with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth holpen* with *Muncke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and ſuch like in the *Earth*. Wherein they doe but grow, in the *Trees*, as they doe in *Pots*; Though (perhaps) with ſome Feeding from the *Trees*. It would be tried alſo with *Shoots* of *Vines*, and *Roots* of *Red-Roſes*; For it may bee, they being of a more Ligneous Nature, will incorporate with the *Tree* it ſelfe.

505 It is an ordinary *Curioſity*, to *Forme Trees* and *Shrubs*, (as *Roſemary*, *Juniper*; and the like,) into *Sundry Shapes*; which is done by Moulding them within, and Cutting them without. But they are but lame Things, being too ſmall to keepe Figure: Great *Caſtles* made of *Trees* upon Frames of Timber, with Turrets, and Arches, were anciently matters of Magnificence.

506 Amongſt *Curioſities*, I ſhall place *Colouration*, though it be ſomewhat better: For *Beauty* in *Flowers* is their Preheminence. It is obſerved by ſome, that *Gilly-flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watred, nor New Moulded, nor Tranſplanted, will turne *White*. And it is probable, that the *White* with much culture, may turne *Coloured*. For this is certaine, that the *White Colour* commeth of Scarcity of Nouriſhment; Except in Flowers that are onely *White*, and admit no other *Colours*.

507 It is good therefore, to ſee what *Natures* doe accompany what *Colours*; For by that you ſhall have Light, how to induce *Colours*, by Producing thoſe *Natures*. *Whites* are more Inodorate, (for the moſt part,) than

than *Flowers* of the ſame kinde *Coloured*; As is found in *Single White Violets*, *White Roſes*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. Wee finde alſo, that *Bloſſomes* of *Trees*, that are *White*, are commonly Inodorate, As *Cherries*, *Peares*, *Plummes*; Whereas thoſe of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are Bluſhy, and Smell ſweet. The *Cauſe* is, for that the Subſtance that Maketh the *Flower*, is of the thinneſt and fineſt of the *Plant*; Which alſo maketh *Flowers* to bee of ſo dainty *Colours*. And if it be too Sparing, and Thinne, it attaineth no Strength of Odour; Except it bee in ſuch *Plants*, as are very Succulent; Whereby they need rather to bee ſcanted in their Nouriſhment, than repleniſhed, to have them ſweet. As wee ſee in *White Satyrion*, which is of a Dainty Smell; And in *Beane-Flowers*, &c. And againe, if the *Plant* bee of Nature, to put forth *White Flowers* onely, and thoſe not thinne, or dry, they are commonly of rancke and fulſome Smell; As *May-Flowers*, and *White Lillies*.

Contrariwiſe, in *Berries*, the *White* is commonly more Delicate, 508
and Sweet in Taſte, than the *Coloured*; As wee ſee in *white Grapes*; In *White Raſpes*; In *White Strawberries*; In *White Currans*, &c. The *Cauſe* is, for that the *Coloured* are more juyced, and courſer juyced; And therefore not ſo well and equally Concocted; But the *White* are better proportioned, to the Diſgeſtion of the *Plant*.

But in *Fruits*, the *White* commonly is meaner; As in *Peare-Plums*, 509
Damaſins, &c. And the Choiceſt *Plummes* are Blacke; The *Mulberry*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Harveſt White-Plumme*, is a baſe *Plumme*; And the *Verdoccio* and *White Date-Plumme*, are no very good *Plummes*. The *Cauſe* is, for that they are all Over-watry: Whereas an higher Concoction is required for Sweetneſſe, or Pleaſure of Taſte; And therefore all your dainty *Plummes*, are a little dry, and come from the Stone; As the *Muſcle-Plumme*, the *Damaſin-Plumme*, the *Peach*, the *Apricot*, &c. Yet ſome *Fruits*, which grow not to bee *Blacke*, are of the Nature of *Berries*, ſweeteſt ſuch as are Paler; As the *Cœur Cherry*, which inclineth more to *White*, is ſweeter than the *Red*; But the *Egriot* is more ſowre.

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*; (As of the 510
Clove-Gilly-Flower, which is the moſt Common;) And ſow it; And there will come up *Gilly-Flowers*, ſome of one *Colour*, and ſome of another, caſually, as the *Seed* meeteth with Nouriſhment in the Earth; So that the *Gardiners* finde, that they may have two or three *Roots* amongſt an hundred, that are rare, and of great Price: As *Purple*, *Carnation* of ſeverall *Stripes*; The *Cauſe* is, (no doubt,) that in *Earth*, though it bee contiguous, and in one Bed, there are very ſeverall *Iuyces*; And as the *Seed* doth caſually meet with them, ſo it commeth forth. And it is noted eſpecially, that thoſe which doe come up *Purple*, doe always come up Single; The *Iuyce*, as it ſeemeth, not being able to ſuffice a *Succulent Colour*, and a *Double Leafe*. This *Experiment* of ſeverall *Colours*,

lours, comming up from one *Seed*, would bee tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppy*, and *Hollyoke*.

511 Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*; *Mulberries* likewise; and *Grapes*, though most toward the Skinne. There is a *Peach* also, that hath a Circle of *Red* towards the Stone: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they have (many times) *Red* sides, are Coloured *Red* within. The *Cause* may bee enquired.

512 The generall *Colour* of *Plants* is *Greene*; which is a *Colour* that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murry*, or *Reddish*; And they be commonly *Young Leaves* that doe so; As it is in *Oakes*, and *Vines*, and *Hasle*. *Leaves* rot into a *Yellow*; And some *Hollies* have part of their *Leaves Yellow*, that are, (to all seeming,) as Fresh and Shining, as the *Greene*. I suppose also, that *Yellow* is a lesse Succulent *Colour*, than *Greene*; And a degree nearer *White*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand ever towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants Bloud-Red*, Stalke and Leafe, and all; as *Amaranthus*. Some *Herbes* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some have *White Leaves*; as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure*, and a *Faire Purple*, are never found in *Leaves*. This sheweth, that *Flowers* are made of a Refined Juyce, of the Earth; And so are *Fruits*: But *Leaves* of a more Course, and Common.

513 It is a *Curiosity* also to make *Flowers Double*; Which is effected by *Often Removing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not Removing, prove *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips* of *Flowers*; And as soone as they come up, to remove them into new Ground, that is good. Enquire also, whether *Inoculating* of *Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Muske-Roses*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*; But that *Tree* beareth no *Fruit*; And, it may bee, that the same Meanes, which applied to the *Tree*, doth extremely accelerate the Sap to rise, and Breake forth; Would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that have *Blossomes Blush-Coloured*.

514 The *Making* of *Fruits* without *Core* or *Stone*, is likewise a *Curiosity*; And somewhat better: Because whatsoever maketh them so, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be set in the Ground, have the *Pith* finely taken forth, (and not altogether, but some of it left, the better to save the life,) it will beare a *Fruit* with little or no *Core*, or *Stone*. And the like is said to bee, of dividing a *Quick-Tree* downe to the Ground, and Taking out the *Pith*, and then binding it up againe.

It

It is reported also, that a *Citron* grafted upon a *Quince*, will have small or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted upon a *Stocke*, that beareth a *Sweeter Fruit*, may both make the *Fruit* sweeter, and more void of the harsh Matter of *Kernells* or *Seeds*. 515

It is reported, that not only the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from Rising in the Middest, and *Turning* it to rise on the Outside, will make the *Fruit* without *Core*, or *Stone*; As if you should boare a *Tree* cleane thorow, and put a wedge in. It is true, there is some Affinitie betweene the *Pith* and the *Kernell*, because they are both of a harsh Substance, and both placed in the Middest. 516

It is reported that *Trees watred* perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core* or *Stone*. And the Rule is generall, that whatsoever will make a *Wilde-Tree* a *Garden-Tree*, will make a *Garden-Tree* to have lesse *Core*, or *Stone*. 517

Experiments in Consort, touching the *Degenerating* of *Plants*; And of the *Transmutation* of them, one into another.

THe Rule is certaine, that *Plants* for want of Culture, *degenerate* to be baser in the same Kinde; And sometimes so farre, as to change into another Kinde. 1. The *Standing long*, and not being *Removed*, maketh them *degenerate*. 2. *Drought*, unlesse the Earth of it selfe be moist, doth the like. 3. So doth *Removing into worse Earth*, or *Forbearing to compost the Earth*; As wee see that *Water-Mint* turneth into *Field Mint*; And the *Colewort* into *Rape* by Neglect, &c. 518

Whatsoever *Fruit* useth to bee set upon a *Root*, or a *Slip*, if it bee *sowne*, will *degenerate*. *Grapes sowne*, *Figs*, *Almonds*, *Pomgranate Kernells sowne*, make the *Fruits degenerate*, and become Wilde. And againe, Most of those *Fruits* that use to bee *grafted*, if they be set of *Kernells*, or *Stones*, *degenerate*. It is true, that *Peaches*, (as hath beene touched before,) doe better upon *Stones Set*, than upon *Grafting*: And the Rule of Exception should seeme to bee this; That whatsoever *Plant* requireth much Moisture, prospereth better upon the *Stone*, or *Kernell*, than upon the *Graft*. For the Stocke, though it giveth a finer Nourishment, yet it giveth a scanter, than the Earth at large. 519

Seeds, if they bee very *old*, and yet have strength enough to bring forth a *Plant*, make the *Plant degenerate*. And therefore skilfull Gardiners make triall of the *Seeds*, before they buy them, whether they be good or no, by Putting them into Water gently Boyled; And if they be good, they will sprout within halfe an Houre. 520

It is strange which is reported, that *Basill* too much exposed to the *Sunne*, doth turne into *Wilde Time*: Although those two *Herbes* seeme to have small Affinitie; but *Basill* is almost the only Hot *Herbe*, that hath Fat and Succulent *Leaves*; Which Oylinesse, if it bee drawne forth by the Sunne, it is like it will make a very great Change. 521

There is an old Tradition, that *Boughs* of *Oake*, put into the Earth, will put forth *Wilde Vines*; Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it selfe. 522

It

523 It is not impossible, and I have heard it verified, that upon *Cutting downe* of an Old *Timber-Tree*, the *Stub* hath put out sometimes a *Tree* of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it bee true, the *Cause* may be, for that the old *Stub* is too scant of Juyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of a smaller kinde, that needeth lesse Nourishment.

524 There is an Opinion in the Countrey, that if the same *Ground* be *oft sowen*, with the *Graine* that *grew upon it*, it will, in the end, grow to be of a baser kinde.

525 It is certaine, that in very *Sterile Yeares*, *Corne sowne* will grow to an *Other Kinde*.

> *Grandia saepe quibus mandavimus Hordea Sulcis,*
> *Infoelix Lolium, & steriles dominantur Avenae.*

And generally it is a Rule, that *Plants*, that are brought forth by *Culture*, as *Corne*, will sooner change into other *Species*, than those that come of themselves: For that *Culture* giveth but an Adventitious Nature, which is more easily put off.

This worke of the *Transmutation* of *Plants*, one into another, is *inter Magnalia Naturae*: For the *Transmutation* of *Species* is, in the vulgar philosophie, pronounced Impossible: And certainly, it is a thing of difficultie, and requireth deepe Search into Nature: But seeing there appeare some manifest *Instances* of it, the Opinion of Impossibilitie is to be rejected; And the Meanes thereof to bee found out. Wee see, that in *Living Creatures*, that come of *Putrefaction*, there is much *Transmutation*, of one into another; As *Catterpillers* turne into *Flies*, &c. And it should seeme probable, that whatsoever *Creature*, having life, is generated without *Seed*, that *Creature* will change out of one *Species* into another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as we may well conclude, that seeing the Earth, of it selfe, doth put forth *Plants*, without *Seed*, therfore *Plants* may well have a *Transmigration of Species*. Wherefore wanting *Instances*, which doe occurre, wee shall give Directions of the most likely *Trialls*: And generally, wee would not have those, that read this our Work of *Sylva Sylvarum*, account it strange, or think that it is an Over-Haste, that wee have set downe Particulars untried; For contrariwise, in our owne Estimation, we account such Particulars, more worthy, than those that are al-

ready tried and knowne. For these Later must bee taken as
you finde them; But the Other doe levell Point blanke at the
Inventing of *Causes*, and *Axiomes*.
First therefore you must make account, that if you will have one 526
Plant change into another, you must have the *Nourishment* over-rule the
Seed; And therefore you are to practise it by *Nourishments* as contrary,
as may be, to the *Nature* of the *Herbe*; So neverthelesse as the *Herbe* may
grow; And likewise with *Seeds* that are of the Weakest Sort, and have
least Vigour. You shall doe well therefore, to take *Marsh-Herbs*, and
Plant them upon Tops of Hills, and Champaignes; And such *Plants* as
require much Moisture, upon Sandy and very drie Grounds. As for
Example, *Marsh-Mallowes*, and *Sedge*, upon Hills; *Cucumber* and *Let-*
tuce-Seeds, and *Colewortes*, upon a *Sandy Plot*; So contrariwise plant
Bushes, *Heath*, *Ling*, and *Brakes*, upon a *Wet* or *Marsh Ground*. This I
conceive also, that all *Esculent* and *Garden-Herbs*, set upon the Tops of
Hills, will prove more *Medicinall*, though lesse *Esculent*, than they were
before. And it may be likewise, some *Wilde Herbs* you may make *Sal-*
let-Herbs. This is the first Rule for *Transmutation* of *Plants*.
The second Rule shall bee to burie some few *Seeds*, of the *Herbe* you 527
would change, amongst other *Seeds*; And then you shall see, whether
the Juyce of those other *Seeds*, doe not so qualifie the Earth, as it will
alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-*
seed amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parsley-Seed*; Or
Basill-Seed amongst *Thyme-Seed*; And see the Change of Taste, or other-
wise. But you shall doe well, to put the *Seed* you would change, into
a little linnen Cloth, that it mingle not with the forraine *Seed*.
The third Rule shall bee, the *Making* of some *Medley* or *Mixture* of 528
Earth, with some other *Plants Bruised*, or *Shaven*, either in *Leafe* or
Root: As for Example, make *Earth* with a *Mixture* of *Colewort-Leaves*,
stamped, and set in it *Artichoakes*, or *Parsnips*; So take *Earth* made with
Majoram, or *Origanum*, or *Wilde-Thyme*, bruised, or stamped, and set in
it *Fennell-Seed*, &c. In which Operation, the Processe of Nature still
will bee, (as I conceive,) not that the *Herbe* you worke upon, should
draw the Juyce of the Forrain *Herbe*; (For that Opinion wee have for-
merly rejected;) But that there will bee a New Confection of Mould,
which perhaps will alter the *Seed*, and yet not to the kinde of the former
Herbe.
The fourth Rule shall be, to marke what *Herbs*, *some Earths doe put* 529
forth of themselves; And to take that *Earth*, and to *Pot* it, or to *Vessell*
it; And in that to set the *Seed* you would change: As for example, take
from under Walls, or the like, where *Nettles* put forth in abundance,
the Earth which you shall there finde, without any *String*, or *Root* of
the *Nettles*; And Pot that *Earth*, and set in it *Stock-gilly-flowers*, or
Wall-Flowers, &c. Or sow in the *Seeds* of them; And see what the
Event will be: Or take *Earth*, that you have prepared to put forth *Mush-*
roomes,

genes, of it selfe, (whereof you shall finde some *Instances* following;) And sow in it *Purslane-seed*, or *Lettuce-Seed*; for in these *Experiments*, it is likely enough, that the *Earth* being accustomed to send forth one Kinde of Nourishment, will alter the new *Seed*.

530 The fifth Rule shall be, to make the *Herbe grow Contrary to his Nature*; As to make *Ground-Herbes* rise in *Heighth*: As for example; Carry *Camomill*, or *Wilde-Thyme*, or the *Greene-Strawberry*, upon Sticks, as you doe *Hops* upon Poles; And see what the Event will bee.

531 The sixth Rule shall be, to make *Plants grow out of the Sunne*, or *open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell up *Earth*, and sow some *Seed* in it, and put it in the Bottome of a Pond; Or put it in some great hollow *Tree*: Trie also the Sowing of *Seeds*, in the Bottomes of Caves; And Pots with *Seeds* sowne, hanged up in Wells, some distance from the Water, and see what the Event will be.

Experiments in Consort touching the *Proceritie*, and *Lownesse*, and *Artificiall dwarfing* of *Trees*.

532 It is certaine, that *Timber-Trees* in *Coppice-woods*, grow more upright, and more free from Under-Boughs, than those that stand in the *Field*. The *Cause* whereof is, for that *Plants* have a Naturall Motion, to get to the Sunne; And besides, they are not glutted with too much Nourishment; For that the *Coppice* shareth with them; And Repletion ever hindreth Stature; Lastly, they are kept warme; And that ever in *Plants* helpeth Mounting.

533 *Trees*, that are, of themselves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gummes*,) as *Firrs*, and *Pines*, mount of themselves in Heighth without Side-Boughs, till they come towards the Top. The *Cause* is, partly Heat; And partly Tenuitie of Juyce; Both which send the Sap upwards. As for *Iuniper*, it is but a *Shrub*, and groweth not bigge enough in Body, to maintaine a tall *Tree*.

534 It is reported, that a Good Strong *Canvas*, spread over a *Tree* grafted low, soone after it putteth forth, will *dwarfe* it, and make it spread. The *Cause* is plaine; For that all Things that grow, will grow as they finde Roome.

535 *Trees* are generally set of *Roots*, or *Kernells*; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*,) some of the *Slips* will take; And those that take, (as is reported,) will bee *Dwarfe-Trees*. The *Cause* is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*.

536 All *Plants*, that put forth their *Sap* hastily, have their Bodies not proportionable to their Length; And therefore they are *Winders*, and *Creepers*; As *Ivy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a slow Putting forth, and lesse Vigour of Mounting.

Experiments in Consort, touching the

The *Scripture* saith, that *Salomon* wrote a *Naturall History*, from the *Cedar* of *Libanus*, to the *Mosse growing upon the Wall*:

For

Rudiments of *Plants*, and of the Excrescences of *Plants*, or *Super-Plants*.

For so the best *Translations* have it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

Mosse groweth chiefly upon *Ridges* of *Houses*, tiled or thatched; And upon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant Greene. The Growing upon *Slopes* is caused, for that *Mosse*, as one the one side it commeth of Moisture and Water, so on the other side the *Water* must but Slide, and not Stand or Poole. And the *Growing* upon *Tiles*, or *Walls*, &c. is caused, for that those dried Earths, having not Moisture sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by Age, or otherwise, they grow to relent and resolve, they sometimes put forth *Plants*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little Stalkes, besides the low Thrumme. 537

Mosse groweth upon *Alleyes*, especially such as lye Cold, and upon the North; As in divers Tarrasses: And againe, if they be much trodden; Or if they were, at the first, gravelled; For wheresoever *Plants* are kept downe, the Earth putteth forth *Mosse*. 538

Old Ground, that hath beene long unbroken up, gathereth *Mosse*: And therfore Husbandmen use to cure their *Pasture Grounds*, when they grow to *Mosse*, by Tilling them for a yeare, or two: Which also dependeth upon the same *Cause*; For that, the more Sparing and Starving Iuyce of the Earth, insufficient for *Plants*, doth breed *Mosse*. 539

Old Trees are more *Mossie*, (farre) than *Young*; For that the Sap is not so frank as to rise all to the Boughes, but tireth by the way, and putteth out *Mosse*. 540

Fountaines have *Mosse* growing upon the *Ground* about them; 541

Muscosi Fontes;

The *Cause* is, for that the *Fountaines* draine the *Water* from the *Ground Adjacent*, and leave but sufficient Moisture to breed *Mosse*: And besides, the *Coldnesse* of the *Water* conduceth to the same.

The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is Excerned, and doth not Assimilate. And upon great *Trees* the *Mosse* gathereth a Figure, like a *Leafe*. 542

The *Moister Sort* of *Trees* yeeld little *Mosse*; As wee see in *Asps*, *Poplars*, *Willowes*, *Beeches*, &c. Which is partly caused, for the Reason that hath beene given, of the francke Putting up of the *Sap* into the *Boughs*; And partly, for that the *Barks* of those *Trees*, are more Close and Smooth, than those of *Oakes*, and *Ashes*; Whereby the *Mosse* can the hardlier issue out. 543

In *Clay-Grounds*, all *Fruit-Trees* grow full of *Mosse*, both upon *Body* and *Boughs*; Which is caused, partly by the *Coldnesse* of the *Ground*, whereby the *Plants* nourish lesse; And partly by the *Toughnesse* of the *Earth*, whereby the *Sap* is shut in, and cannot get up, to spread so franckly, as it should doe. 544

O We

545 Wee have said heretofore, that if *Trees* be *Hide-bound*, they wax lesse Fruitfull, and gather *Mosse*: And that they are holpen by *Hacking*, &c. And therefore by the Reason of Contraries, if *Trees* be bound in with *Cords*, or some Outward *Bands*, they will put forth more *Mosse*: Which (I thinke) happeneth to *Trees* that stand Bleake, and upon the Cold Winds. It would also be tried, whether, if you cover a *Tree*, somewhat thick upon the top, after his Powling, it will not gather more *Mosse*. I thinke also, the *Watring* of *Trees* with *Cold Fountaine-Water*, will make them grow full of *Mosse*.

546 There is a *Mosse* the *Perfumers* have, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quære* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* sake, being a Thing of Price, I have set downe the last *Experiments*, how to multiply, and call on *Mosses*.

Next unto *Mosse*, I will speake of *Mushromes*; Which are likewise an *Vnperfect Plant*. These *Mushromes* have two strange *Properties*; The One, that they yeeld so *Delicious* a *Meat*; The other, that they *come up* so *hastily*; As in a *Night*; And yet they are *Vnsowne*. And therefore, such as are Upstarts in State, they call, in reproch, *Mushromes*. It must needs be therefore, that they be made of much *Moisture*; And that *Moisture* Fat, Grosse, and yet somewhat Concocted. And (indeed) we finde, that *Mushromes* cause the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Empoyson. And this sheweth, that they are Windy; And that Windinesse is Grosse, and Swelling; Not Sharp, or Griping. And upon the same reason *Mushromes* are a venereous Meat.

547 It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the Moistest of *Trees*,) cut small, and cast into *Furrowes* well dunged, will cause the Ground to put forth *Mushromes*, at all *Seasons* of the *Yeare*, fit to be eaten. Some adde to the Mixture *Leaven* of *Bread*, resolved in *Water*.

548 It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, be set on *Fire*, in a *Showrie Season*, it will put forth great Store of *Mushromes*.

549 It is reported, that *Harts-Horne*, *Shaven*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth up *Mushromes*. And wee know *Harts-Horne* is of a Fat and Clammie Substance: And it may be *Oxe-Horne* would doe the like.

550 It hath beene reported, though it be scarce credible, that *Ivy* hath growne out of a *Stags-Horne*; Which they suppose, did rather come from

from a *Confrication* of the *Horne* upon the *Ivy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may be Triall made of some *Seeds*, as that of *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

551 There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones Hat; Which they call a *Toads-Stoole*: But it is not Esculent; And it groweth (commonly) by a dead Stub of a *Tree*; And likewise about the *Roots* of *Rotten Trees*: And therefore seemeth to take his Iuyce from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a ranke *Moisture*.

552 There is a *Cake*, that groweth upon the Side of a *Dead Tree*, that hath gotten no Name, but it is large, and of a Chesnut Colour, and hard, and pithy; Whereby it should seeme, that even *Dead Trees* forget not their Putting forth; No more than the *Carcasses* of *Mens Bodies*, that put forth *Haire*, and *Nailes*, for a Time.

553 There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* upon the Breaking: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to be good for *Kibes*. Belike it hath a *Corrosive*, and *Fretting Nature*.

554 There is an *Herb* called *Iewes-Eare*, that groweth upon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange Propertie; For in *Warme water*, it swelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is used for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to have a Mollifying, and Lenifying Vertue.

555 There is a Kinde of *Spongie Excrescence*, which groweth chiefly upon the *Roots* of the *Laser-Tree*; And sometimes upon *Cedar*, and other *Trees*. It is verie White, and Light, and Friable: Which wee call *Agarick*. It is famous in *Physicke* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liver*: But Offensive to the *Stomack*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*.

556 We finde no *Super-Plant*, that is a Formed *Plant*, but *Misseltoe*. They have an idle Tradition, that there is a *Bird*, called a *Missel-Bird*, that feedeth upon a *Seed*, which many times shee cannot digest, and so expelleth it whole with her Excrement: which falling upon a *Bough* of a *Tree*, that hath some Rift, putteth forth the *Misseltoe*. But this is a Fable: For it is not probable, that *Birds* should feed upon that they cannot digest. But allow that, yet it cannot be for other Reasons: For First, it is found but upon certaine *Trees*; And those *Trees* beare no such *Fruit*, as may allure that *Bird* to sit, and feed upon them. It may be, that *Bird* feedeth upon the *Misseltoe-Berries*, and so is often found there; Which may have given occasion to the Tale. But that which maketh an End of the Question,

stion, is, that *Misseltoe* hath beene found to put forth under the *Boughes*, and not (onely) above the *Boughes*: So it cannot be any Thing that falleth upon the *Bough*. *Misseltoe* groweth chiefly upon *Crab-Trees*, *Apple-Trees*, sometimes upon *Hasles*; And rarely upon *Oakes*; The *Misseltoe* whereof is counted verie *Medicinall*. It is ever greene, Winter and Summer; And beareth a *White Glistering Berry*: And it is a *Plant*, utterly differing from the *Plant*, upon which it groweth. Two things therefore may be certainly set downe: First, that *Super-fœtation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth excerne, and cannot assimilate; For else it would goe into a *Bough*; And besides, it seemeth to be more Fat and Unctuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammie; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557 This *Experiment* of *Misseltoe* may give Light to other Practices. Therefore Triall would be made, by Ripping of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Watring* of the Wound everie Day, with *warme Water Dunged*, to see if it would bring forth *Misseltoe*, or any such like Thing. But it were yet more likely to trie it, with some other *Watring*, or *Anointing*, that were not so Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be such Things as kill not the *Bough*.

558 It were good to trie, what *Plants* would put forth, if they be forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and cover it, some thickneſſe, with *Clay* on the Top; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* also, the *Tree* would be cloſed with somewhat, that is not so Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559 A Man may count the *Prickles* of *Trees* to be a kinde of *Excreſcence*; For they will never be *Boughes*, nor beare *Leaves*. The *Plants* that have *Prickles*, are *Thornes*, blacke and white; *Brier*; *Roſe*; *Limon-Trees*; *Crab-Trees*; *Gooſe-Berry*; *Berbery*; Theſe have it in the *Bough*; The *Plants* that have *Prickles* in the *Leaſe*, are; *Holly*; *Iuniper*; *Whin-buſh*; *Thiſtle*; *Nettles* also have a small Venomous *Prickle*; So hath *Borrage*, but harmeleſſe. The *Cauſe* must be *Haſtie Putting forth*; *Want* of *Moiſture*; And the *Cloſeneſſe* of the *Barke*; For the *Haſte* of the *Spirit to put forth*, and the *want* of *Nouriſhment* to put forth a *Bough*, and the *Cloſeneſſe* of the *Barke*, cauſe *Prickles* in *Boughes*; And therefore they are ever like a *Pyramis*, for that the *Moiſture* spendeth after a little Putting forth. And for *Prickles* in *Leaves*, they come also of *Putting forth more Iuyce* into the *Leaſe*, than can spread in the *Leaſe* smooth; And therfore the *Leaves* otherwiſe are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but never *Plaine*, but as it were with *Folds*, for the same *Cauſe*.

There

There be also *Plants*, that though they have no *Prickles*, yet they have a Kinde of *Downy* or *Velvet Rine*, upon their *Leaves*; As *Roſe-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe* or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Subſtance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Roſe-Campions*, stamped, have beene applied, (with succeſſe,) to the *Wriſts* of those that have had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a Sanative vertue, towards the *Lungs*; And the *Leaſe* also is *Healing* in *Surgerie*.

560

561 Another Kinde of *Excreſcence* is an *Exudation* of *Plants*, joyned with *Putrefaction*; As we see in *Oake-Apples*, which are found chiefly upon the *Leaves* of *Oakes*; And the like upon *Willowes*: And Countrey People have a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *wormes*, it is a Signe of a *Peſtilent Yeare*; Which is a likely Thing, becauſe they grow of Corruption.

562 There is also upon *Sweet*, or other *Brier*, a fine *Tuft*, or *Bruſh* of *Moſſe*, of divers Colours; Which if you cut, you shall ever finde full of little white *Wormes*.

Experiments in Conſort, touching the *Producing* of *Perfect Plants* without *Seed*.

563 IT is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houſes*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth Sundrie Kindes of *Herbs*: But some *Time* is required, for the *Germination*; For if it be taken, but from a *Fathome* deepe, it will put forth the *Firſt Yeare*; If much deeper, not till after a *Yeare*, or *Two*.

564 The *Nature* of the *Plants* growing out of *Earth* so taken up, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* be *Soft*, and Fine, it putteth forth Soft *Herbs*; As *Graſſe*, *Plantine*, and the like; If the *Earth* be Harder and Courſer, it putteth forth *Herbs* more *Rough*, as *Thiſtles*, *Firres*, &c.

565 It is Common *Experience*, that where *Alleyes* are close *Gravelled*, the *Earth* putteth forth, the first yeare, *Knot-graſſe*, and after *Spire-graſſe*. The *Cauſe* is, for that the *Hard Gravell*, or *Pebble* at the first Laying, will not suffer the *Graſſe* to come forth upright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat looſened at the Top, the Ordinarie *Graſſe* commeth up.

566 It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, some depth, and Potted, will put forth *Herbs* of a Fat and Iuycie Subſtance; As *Penny-wort*, *Purſlane*, *Houſleeke*, *Penny-royall*, &c.

567 The *Water* also doth send forth *Plants*, that have no *Roots* fixed in the Bottome; But they are leſſe *Perfect Plants*; being almoſt but *Leaves*, and those Small ones: Such is that wee call *Duck-Weed*; Which hath a *Leaſe* no bigger than a *Tyrant-Leaſe*, but of a freſher Greene; and putteth forth a little *String* into the *Water*, farre from the *Bottome*. As for the *Water-Lilly*, it hath a *Roote* in the *Ground*: And so have a Number of other *Herbs* that grow in *Ponds*.

568 It is reported by some of the *Ancients*, and some *Moderne Teſtimonie* likewiſe, that there be some *Plants*, that grow upon the Top of the *Sea*;

Being supposed to grow of some *Concretion* of *Slime* from the *Water*, where the *Sunne* beateth hot, and where the *Sea* stirreth little. As for *Alga Marina*, (*Sea-weed*,) and *Eryngium* (*Sea-Thistle*,) both have *Roots*; but the *Sea-weed* under the *Water*, the *Sea-Thistle* but upon the *Shore*.

569 The Ancients have noted, that there are some *Herbs*, that grow out of *Snow*, laid up close together, and *Putrified*; And that they are all *Bitter*; And they name one specially, *Flomus*, which wee call *Moth-Mullein*. It is certaine, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not unlike, that it may likewise put forth *Plants*.

570 The *Ancients* have affirmed, that there are some *Herbs*, that grow out of *Stone*; Which may be, for that it is certaine, that *Toads* have been found in the Middle of a Free-Stone. We see also, that *Flints*, lying above *Ground*, gather *Mosse*; And *Wall-Flowers*, and some other *Flowers*, grow upon *Walls*; But whether upon the Maine *Bricke*, or *Stone*; or whether out of the *Lime*, or *Chincks*, is not well observed; For *Elders* and *Ashes* have beene seene to grow out of *Steeples*: But they manifestly grow out of *Clefts*; In so much as when they grow big, they will disjoyne the *Stone*. And besides it is doubtfull, whether the *Mortar* it selfe putteth it forth, or whether some *Seeds* be not let fall by *Birds*. There be likewise *Rock-Herbs*; But I suppose those are, where there is some *Mould* or *Earth*. It hath likewise beene found, that great *Trees* growing upon *Quarries*, have put downe their *Root* into the *Stone*.

571 In some *Mines* in *Germany*, as is reported, there grow in the Bottome *Vegetables*, And the *Wonke-Folks* use to say, they have *Magicall Vertue*; And will not suffer men to gather them.

572 The *Sea-Sands* seldome beare *Plants*. Whereof the *Cause* is yeelded, by some of the *Ancients*, for that the *Sunne* exhaleth the *Moisture*, before it can incorporate with the *Earth*, and yeeld a Nourishment for the *Plants*. And it is affirmed also, that Sand hath (alwayes) his *Root* in *Clay*; And that there be no Veines of *Sand*, any great depth within the *Earth*.

573 It is certaine, that some *Plants* put forth for a time, of their owne *Store*, without any *Nourishment* from *Earth*, *Water*, *Stone*, &c. Of which *vide* the *Experiment* 29.

Experiments in Consort touching Forraine Plants.

574 It is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballast* of *Ships*, cast upon some *Grounds* in *Italy*, did put forth *Forraine Herbs*, to us in *Europe* not knowne: And, that which is more, that of their *Roots*, *Barks*, and *Seeds*, contused together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs*, much like the Other.

575 *Plants* brought out of *Hot Countries*, will endevour to put forth, at the same *Time*, that they usually do in their owne *Climate*; And therfore to preserve them, there is no more required, than to keepe them from the Injurie of Putting back by *Cold*. It is reported also, that *Graine* out of

of the *Hotter Countries* translated into the *Colder*, will be more forward, than the Ordinarie *Graine* of the *Cold Countrey*. It is likely, that this will prove better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; And so the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embased by the *Ground*, to which it is Removed.

576 Many *Plants*, which grow in the *Hotter Countries*; being set in the *Colder*, will nevertheless, even in those *Cold Countries*, being sowne of *Seeds* late in the *Spring*, come up and abide most Part of the *Summer*; As wee finde it in *Orenge*, and *Limon-Seeds*, &c. The *Seeds* whereof, Sowen in the End of *Aprill*, will bring forth Excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be sowen, would doe the like.

Experiments in Consort, touching the *Seasons* in which *Plants* come forth.

577 THere be some *Flowers*, *Blossomes*, *Graines*, and *Fruits*, which come more *Early*; And Others which come more *Late* in the Yeare. The *Flowers* that come early, with us, are; *Prime-Roses*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and some early *Tulippa's*. And they are all *Cold Plants*; Which therefore, (as it should seeme,) have a quicker *Perception*, of the *Heat* of the *Sunne* Increasing, than the *Hot Herbs* have; As a *Cold Hand* will sooner finde a little *Warmth*, than a *Hot*. And those that come next after, are *Wall-Flowers*, *Cowslips*, *Hyacinths*, *Rosemary-Flowers*, &c. And after them, *Pinckes*, *Roses*, *Flowerdelucces*, &c. And the latest are *Gilly-Flowers*, *Holly-oakes*, *Larkes-Foot*, &c. The Earliest *Blossomes* are, the *Blossomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of such *Trees*, as have much *Moisture*, either *Watrie*, or *Oylie*. And therefore *Crocus Vernus* also, being an *Herb*, that hath an *Oylie Iuyce*, putteth forth early. For those also finde the *Sunne* sooner than the *Drier Trees*. The *Graines* are, first *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Pease* and *Beanes*. For though Greene *Pease* and *Beanes* be eaten sooner, yet the Drie Ones, that are used for *Horse-Meat*, are ripe last; And it seemeth that the Fatter *Graine* commeth first. The Earliest *Fruits* are, *Strawberries*, *Cherries*, *Gooseberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Rasps*; And after them *Damasins*, and most Kinde of *Plums*, *Peaches*, &c. And the latest are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Heps*, *Medlars*, *Services*, *Cornelians*, &c.

578 It is to be noted, that (commonly) *Trees* that *ripen latest*, *blossome soonest*: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it seemeth to be a Worke of Providence, that they blossome so soone; For otherwise, they could not have the *Sunne* long enough to ripen.

579 There be Fruits, (but rarely,) that come *twice* a *Yeare*; as some *Peares*, *Strawberries*, &c. And it seemeth they are such, as abound with Nourishment; Whereby after one Period, before the *Sunne* waxeth too weake, they can endure another. The *Violet* also, amongst *Flowers*, commeth twice a Yeare; Especially the *Double White*; And that also is

is a *Plant* full of Moisture. *Roses* come twice, but it is not without *Cutting*, as hath beene formerly said.

580 In *Muscovia*, though the *Corne* come not up, till late *Spring*, yet their *Harvest* is as Early as Ours. The *Cause* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee see with us, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after those kinde of *winters* likewise, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the same time; Which troubleth the *Husbandman* many times; For you shall have *Red Roses*, and *Damaske Roses*, come together; And likewise the *Harvest* of *Wheat* and *Barley*. But this happeneth ever, for that the Earlier stayeth for the Later; And not that the Later commeth sooner.

581 There be divers *Fruit-Trees*, in the *Hot Countries*, which have *Blossomes*, and *Young Fruit*, and *Ripe Fruit*, almost all the Yeare, succeeding one another. And it is said, the *Orenge* hath the like with us, for a great Part of Summer; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to have so; But that either they want *Iuyce* to spend; Or they meet with the *Cold* of the Winter: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582 Some *Herbs* are but *Annuall*, and die, *Root* and all, once a Yeare; As *Borrage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basill*, *Tobacco*, *Mustard-Seed*, and all kindes of *Corne*: Some continue many Yeares; As *Hyssope*, *Germander*, *Lavander*, *Fennell*, &c. The *Cause* of the *Dying* is double; The first is the *Tendernesse* and *weaknesse* of the *Seed*, which maketh the Period in a small time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are Hot. The other *Cause* is, for that some *Herbs* can worse endure *Colde*; As *Basill*, *Tobacco*, *Mustard-Seed*. And these have (all) much *Heate*.

Experiments in Consort touching the *Lasting* of *Herbs* and *Trees*.

583 THe *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oakes*, *Elme*, *Chest Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*. But in *Herbs* it is often contrarie; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largest Size*, are of small Durance; Whereas *Hyssope*, *winter-Savoury*, *Germander*, *Thyme*, *Sage*, will last long. The *Cause* is, for that *Trees* last according to the *Strength*, and *Quantitie* of their *Sap* and *Iuyce*; Being well munited by their *Barke* against the Injuries of the *Aire*: But *Herbs* draw a Weake *Iuyce*, And have a soft *Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Stickie Stalke*.

584 *Trees* that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chestnuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Peares*, *Plums*, &c. The *Cause* is the *Fatnesse* and *Oylinesse* of the *Sap*; Which ever wasteth lesse, than the more *Watry*.

585 *Trees*, that bring forth their *Leaves* late in the *Yeare*, and cast them likewise late, are more *lasting*, than those that sprout their Leaves Early, or shed

shed them betimes. The *Cause* is, for that the late *Comming forth* sheweth a *Moisture* more fixed; And the other more loose, and more easily resolved. And the same *Cause* is, that *Wilde-Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is Acide, more than those whose *Fruit* is sweet.

586 Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For every *Cutting* causeth a Renovation of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Insomuch as *Annuall Plants*, if you cut them seasonably, and will spare the use of them, and suffer them to come up still young, will last more Yeares than one; As hath beene partly touched; Such as is *Lettuce*, *Purslane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Over-growne-Trees*, in Church-yards, or neare Ancient Buildings, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height.

587 Some *Experiment* would be made, how by *Art* to make *Plants* more *Lasting*, than their ordinarie Period; As to make a *Stalke* of *Wheat*, &c. last a whole yeare. You must ever presuppose, that you handle it so, as the *Winter* killeth it not; For we speake onely of *Prolonging* the *Naturall Period*. I conceive, that the *Rule* will hold; That whatsoever maketh the *Herb* come later, than at his time, will make it last longer time: It were good to trie it, in a *Stalke* of *Wheat*, &c. set in the Shade, and encompassed with a Case of *Wood*, not touching the *Straw*, to keepe out Open *Aire*.

As for the Preservation *of* Fruits, *and* Plants, *as well upon the* Tree, *or* Stalke, *as gathered, we shall handle it under the* Title *of* Conservation *of* Bodies.

Experiments in Consort touching the severall *Figures* of *Plants*.

588 THe *Particular Figures* of *Plants* wee leave to their *Descriptions*; But some few Things, in generall, we will observe. *Trees* & *Herbs*, in the Growing forth of their *Boughes*, and *Branches*, are not *Figured*, and keep no Order. The *Cause* is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalks* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they breake forth casually, where they finde best way, in the *Barke*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Peare-Tree*, (which the *Criticks* will have to borrow his name of πῦρ, *Fire*,) *Orenge-Trees*, *Firre-Trees*, *Service-Trees*, *Lime-Trees*, &c. And some are more spred and broad; As *Beeches*, *Hornebeame*, &c. The rest are more indifferent. The *Cause* of Scattering the *Boughes*, is the Hastie breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height, but branch neare the *Ground*. The *Cause* of the *Pyramis*, is the Keeping in of the *Sap*, long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The

Spreading

Spreading is caused by the *Carrying* up of the *Sap*, plentifully, without Expence; And then putting it forth speedily, and at once.

589 There be divers *Herbs*, but no *Trees*, that may be said to have some kinde of Order, in the Putting forth of their *Leaves:* For they have *Joynts*, or *Knuckles*, as it were Stops in their *Germination*; As have *Gilly-Flowers*, *Pincks*, *Bennell*, *Corne*, *Reeds*, and *Canes*. The *Cause* whereof is, for that the *Sap* ascendeth unequally, and doth (as it were) tire and stop by the way. And it seemeth, they have some *Closenesse*, and *Hardnesse* in their *Stalke*, which hindreth the *Sap* from going up, untill it hath gathered into a Knot, and so is more urged to put forth. And therefore, they are most of them hollow, when the *Stalke* is dry. As *Fennell-Stalk*, *Stubble*, and *Canes*.

590 *Flowers* have (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Foure*; As in *Prime-Roses*, *Brier-Roses*, *Single Muske-Roses*, *Single Pinks*, and *Gilly-Flowers*, &c. which have five *Leaves:* *Lillies*, *Flower-de-luces*, *Borage*, *Bugloss*, &c. which have foure Leaves. But some put forth *Leaves* not Numbred; But they are ever small Ones; As *Mary-Golds*, *Trifoile*, &c. Wee see also, that the *Sockets*, and *Supporters* of *Flowers* are *Figured*; As in the Five *Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*, &c. *Leaves* also are all *Figured*; Some Round, Some Long; None Square; And many jagged on the Sides; Which *Leaves* of *Flowers* seldome are. For I account the *Jagging* of *Pinks*, and *Gilly-Flowers*, to be like the Inequalitie of *Oake-leaves*, or *Vine-leaves*, or the like; But they seldome or never have any small *Purles*.

Experiments in Consort touching some *Principall Dissentes* in *Plants*.

591 OF *Plants*, some few put forth their *Blossomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But most put forth some *Leaves* before their *Blossomes*; As *Apples*, *Peares*, *Plums*, *Cherries*, *White-Thorne*, &c. The *Cause* is, for that those, that put forth their *Blossomes* first, have either an Acute and *Sharp Spirit*; (And therefore commonly they all put forth earely in the Spring, and ripen verie late; As most of the Particulars before mentioned;) Or else an *Oyly Iuyce*, which is apter to put out *Flowers*, than *Leaves*.

592 Of *Plants*, some are *Greene* all *Winter*; Others cast their *Leaves*. There are *Greene* all *Winter*; *Holly*, *Ivy*, *Box*, *Firre*, *Eugh*, *Cypresse*, *Iuniper*, *Bayes*, *Rose-Mary*, &c. The *Cause* of the Holding *Greene*, is the Close and Compact *Substance* of their *Leaves*, and the *Pedicles* of them. And the *Cause* of that againe, is either the *Tough* and *Viscous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the first Sort is *Holly*: Which is of so *Viscous* a *Iuyce*, as they make *Birdlime* of the *Barke* of it. The *Stalke* of *Ivy* is Tough, and not Fragile, as wee see in other small Twigs dry. *Firre* yeeldeth *Pitch*. *Box* is a fast and heavie *Wood*, as we see it in *Boules*. *Eugh* is a Strong and Tough *Wood*, as we see it in *Bowes*. Of the second Sort is *Iuniper*, which is a *Wood* Odorate, and maketh a hot Fire. *Bayes* is likewise a Hot and Aromaticall *wood*; And so is *Rose-Mary* for a *Shrub*. As for the *Leaves*, their Densitie appeareth, in that, either they are Smooth and

and Shining, as in *Bayes*, *Holly*, *Ivy*, *Box*, &c. Or in that they are Hard and Spirie, as in the rest. And Triall would be made of *Grafting* of *Rose-Marie*, and *Bayes*, and *Box*, upon a *Holly-Stocke*; Because they are *Plants* that come all *Winter*. It were good to trie it also with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde-Trees*; To see whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*; because the *Sap* of the *Holly* putteth forth most in the *winter*. It may be also a *Mezerion-Tree*, grafted upon a *Holly*, will prove both an Earlier, and a Greater *Tree*.

593 There be some *Plants*, that beare no *Flower*, and yet beare *Fruit:* There be some, that beare *Flowers*, and no *Fruit:* There be some that beare neither *Flowers*, nor *Fruit*. Most of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers:* Some few (likewise) of the *Fruit-Trees*; As *Mulberrie*, *Wall nut*, &c. And some *Shrubs*, (as *Iuniper*, *Holly*, &c.) beare no *Flowers*. Divers *Herbs* also beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*; As *Purslane*, &c. Those that beare *Flowers* and no *Fruit*, are few; As the *Double Cherrie*, the *Sallow*, &c. But for the *Cherrie*, it is doubtfull, whether it be not by Art, or Culture; For if it be by Art, then Triall would be made, whether *Apples*, and other *Fruits Blossomes*, may not be doubled. There are some Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c.

594 There be some *Plants*, that shoot still upwards, and can *Support* themselves; As the greatest Part of *Trees* and *Plants:* There be some Other, that *Creepe* along the *Ground*; Or *Winde* about other *Trees*, or *Props*, and cannot support themselves; As *Vines*, *Ivy*, *Briar*, *Briony*, *Woodbines*, *Hop's*, *Climatis*, *Camomill*, &c. The *Cause* is, (as hath beene partly touched,) for that all *Plants*, (naturally) move upwards; But if the *Sap* put up too fast, it maketh a slender *Stalke*, which will not support the weight: And therefore these latter Sort are all Swift and Hastie Commers.

Experiments in Consort touching all Manner of *Composts*, and *Helps* of *Ground*.

595 THe first and most Ordinatie *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the best; And next, the *Dung* of *Kine:* And thirdly, that of *Horses:* Which is held to be somewhat too hot, unlesse it be mingled. That of *Pigeons* for a Garden, or a small Quantitie of Ground, excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to spread it immediately before the *Ploughing* and *Sowing*: And so to *Plough* it in: For if you spread it long before, the *Sunne* will draw out much of the *Fatnesse* of the *Dung:* If the *Ground* be *Grazing Ground*, to spread it somewhat late, towards *Winter*; That the *Sunne* may have the lesse Power to drie it up. As for speciall *Composts* for *Gardens*, (as a *Hot Bed*, &c.) wee have handled them before.

596 The Second *Kind* of *Compost*, is the *Spreading* of divers *Kinds* of *Earth*; As *Marle*, *Chalke*, *Sea-Sand*, *Earth* upon *Earth*, *Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the best; As having most Fatnesse; And

And not Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Rudiment of life. *Chalk* over-heateth the *Ground* a little. And therfore is best upon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say, that it was a common Errour, to thinke that *Chalk* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: but that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterwards it will beare little *Grasse*, because the *Ground* is tired out. It were good to trie the laying of *Chalke* upon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it must be Friable first, by Raine, or Lying: As for *Earth*, it *Compasseth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred upon it; And it did beare *Fruit* excellently the first yeare of the Planting: For the *Surface* of the *Earth* is ever the Fruitfullest. And *Earth* so prepared hath a double *Surface*. But it is true, as I conceive, that such *Earth*, as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the Sunne, and the Growth of *Vegetables*. And therefore, if you make a large Hovell, thatched, over some Quantitie of Ground; Nay if you doe but Planck the Ground over, it will breed *Salt-Petre*. As for *Pond-Earth*, or *River-Earth*, it is a verie good *Compost*; Especially if the *Pond* have been long uncleansed, and so the *Water* be not too Hungrie: And I judge it will be yet better, if there be some *Mixture* of *Chalke*.

597 The Third *Help* of *Ground*, is, by some other *Substances*, that have a Vertue to make *Ground* Fertile; though they be not meerely *Earth*: wherein *Ashes* excell; In so much as the Countries about *Ætna*, and *Vesuvius*, have a kinde of Amends made them, for the Mischiefe the Eruptions (many times) doe, by the exceeding *Fruitfulnesse* of the *Soile*, caused by the *Ashes*, scattered about. *Soot* also, though thin spred, in a *Field*, or *Garden*, is tried to be a verie good *Compost*. For *Salt*, it is too Costly: But it is tried, that mingled with *Seed-Corne*, and sowen together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all over. As for the *Steeping* of the *Seeds*, in severall *Mixtures* with *Water*, to give them Vigour; Or *Watring Grounds* with *Compost-Water*; We have spoken of them before.

598 The Fourth *Help* of *Ground*, is, the *Suffering* of *Vegetables* to dye into the *Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease*. *Brakes* cast upon the *Ground*, in the beginning of *Winter*, will make it verie Fruitfull. It were good (also) to trie, whether *Leaves* of *Trees* swept together, with some *Chalke* and *Dung* mixed, to give them more Heart, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lye scattered, and without Mixture, they rather make the *Ground* soure, than otherwise.

The

599 The Fifth *Help* of *Ground*, is *Heat* and *Warmth*. It hath beene anciently practised to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, upon the *Ground*: Wee see, that *Warmth* of *Walls* and *Enclosures*, mendeth *Ground*: Wee see also that *Lying open* to the *South*, mendeth *Ground*: Wee see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *compost*: And it may bee doubted, whether the *Covering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof wee spake in the last *Experiment*,) helpeth it not, by reason of the *Warmth*. Nay some very good *Husbands* doe suspect, that the *Gathering* up of *Flints*, in *Flinty Ground*, and Laying them on *Heapes* (which is much used,) is no good *Husbandry*; For that they would keep the *Ground* Warme.

600 The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting* out *waters*, at seasonable Times: For *Water*, at some Seasons, and with reasonable stay, doth good; But at some other Seasons, and with too long Stay, doth hurt. And this serveth onely for *Meadowes*, which are along some *River*. The other way is, to bring *Water*, from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it traverse to spread the *water*. And this maketh an excellent Improvement, both for *Corne*, and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the Fatnesse of the *Earth*: But howsoever it profiteth much. Generally, where there are great Overflowes, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground* warme, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *water* may not stay too long in the *Spring*, till the *weeds* and *Sedge* bee growne up; For then the *Ground* will bee like a Wood, which keepeth out the Sunne; And so continueth the Wet; Whereby it will never graze (to purpose) that yeare. Thus much for *Irrigation*. But for *Avoydances*, and *Drayning*s of water, where there is too much, and the *Helps* of *Ground* in that kinde, wee shall speake of them in another Place.

NATVRALL HISTORIE.

VII. Century.

THe *Differences* betweene *Animate* and *Inanimate Bodies*, wee shall handle fully under the *Title* of *Life*, and *Living Spirits*, and *Powers*. Wee shall therefore make but a briefe Mention of them in this Place. The Maine *Differences* are two. All *Bodies* have *Spirits*, and *Pneumaticall Parts* within them: But the Maine *Differences* betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits* of *Things Animate*, are all *Continued* with themselves, and are *Branched* in *Veines*, and secret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* have not only *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not peruious one to another; As *Aire* is in *Snow*. The second Maine *Difference* is, that the *Spirits* of *Animate Bodies*, are all in some degree, (more or lesse,) kindled and inflamed; And have a fine *Commixture* of *Flame*, and an *Aeriall Substance*. But *Inanimate Bodies* have their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* consisteth not in the *Heat* or *Coolenesse* of *Spirits*; For *Cloves* and other *Spices*, *Naphtha* and *Petroleum*, have exceeding *Hot Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of those Weake and Temperate *Bodies* come

Experiments in Consort, touching the *Affinities*, and *Differences*, betweene *Plants* and *Inanimate Bodies*.

601.

to be Inflamed, then they gather a much greater *Heat*, than others have *Uninflamed*, besides their *Light*, and *Motion*, &c.

602 The *Differences*, which are *Secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They have an *Accretion*, but no *Alimentation*. Thirdly, *Plants* have a *Period* of *Life*; which *Inanimate Bodies* have not. Fourthly, they have a *Succession*, and *propagation* of their *Kindes*; which is not in *Bodies Inanimate*.

603 The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those foure before mentioned, (For *Metalls* I hold Inanimate,) are these: First *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part above *Earth*, and part under *Earth*.

604 There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Nearest of both *Kindes*: Another is *Vitrioll*, for that is aptest to sprout with *Moisture*.

605 Another speciall *Affinitie* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it dissolve not in *Arefaction*) will in the ende issue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Mosse*, and *Mushromes*, and *Agaricke*, and other of those kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselves, and a Number of other things, after a *Mouldinesse*, or *Rottennesse*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which have *Affinitie* with *Plants*, have this *Difference* from them; That they have no *Succession* or *Propagation*, though they *Nourish*, and have a *Period* of *Life*, and have likewise some *Figure*.

606 I left once, by chance, a *Citron* cut, in a close Roome, for three Summer-moneths, that I was absent; And at my Returne, there were grown forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke Heads, as if they would have beene some *Herbe*.

Experiments in Consort touching the *Affinities*, and *Differences*, of *Plants*, and *Living Creatures*: And the *Confiners* and *Participles* of them.

607 The *Affinities* and *Differences* betweene *Plants* and *Living Creatures*, are these that follow. They have both of them *Spirits Continued*, and *Branched*; and also *Inflamed*: But first in *Living Creatures*, the *Spirits* have a *Cell* or *Seat*, which *Plants* have not; As was also formerly said. And secondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And these two are the *Radicall Differences*. For the *Secondary Differences*, they are as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are severed, and of themselves. Secondly, *Living Creatures* have *Locall Motion*; *Plants* have not. Thirdly, *Living Creatures* nourish from their *Upper Parts*, by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Roots*. Fourthly, *Plants* have their *Seed* and *Seminall Parts* uppermost; *Living Creatures* have

have them lower most: And therefore it was said, not elegantly alone, but Philosophically; *Homo est Planta inversa*; *Man is like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* have a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* have more *Diversity* of *Organs* within their *Bodies*; and (as it were) *Inward Figures*, than *Plants* have. Seventhly, *Living Creatures* have *Sense*, which *Plants* have not. Eighthly, *Living Creatures* have *Voluntary Motion*, which *Plants* have not.

For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name distinguished; As *Male-Piony*, *Female-Piony*; *Male-Rose-mary*, *Female-Rose-mary*; *Hee-Holly*, *Shee-Holly*; &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The nearest Approach of it, is betweene the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neare, incline the one to the other: Insomuch as, (that which is more strange,) they doubt not to report, that to keepe the *Trees* upright from Bending, they tye *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enjoyed by the *Contact* of a *Middle Body*. But this may be Faigned, or at least Amplified. Neverthelesse, I am apt enough to thinke, that this same *Binarium* of a Stronger and a Weaker, like unto *Masculine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, wherein no *Markes* of *Distinction* appeare: And it is doubled sometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in most *Species*. 608

The *Participles* or *Confiners* betweene *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and have no *Locall Motion* of *Remove*, though they have a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a Fabulous Narration, that in the *Northerne Countries*, there should be an *Herbe* that groweth in the likenesse of a *Lambe*, and feedeth upon the *Grasse*, in such sort as it will bare the *Grasse* round about. But I suppose, that the *Figure* maketh the *Fable*; For so wee see, there bee *Bee-Flowers*, &c. And as for the *Grasse*, it seemeth the *Plant*, having a great *Stalke* and *Top*, doth prey upon the *Grasse*, a good way about, by drawing the *Juyce* of the *Earth* from it. 609

Experiments *Promiscuous* touching *Plants*.

The *Indian Fig* boweth his *Roots* downe so low, in one yeare, as of it selfe it taketh *Root* againe: And so multiplieth from *Root* to *Root*; Making of one *Tree* a kinde of *wood*. The *Cause* is the *Plenty* of the *Sap*, and the *Softnesse* of the *Stalke*, which maketh the *Bough*, being overloaden, and not stiffely upheld, weigh downe. It hath *Leaves*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cause* is, for that the continuall Shade increaseth the *Leaves*, and abateth the *Fruit*; which neverthelesse is of a pleasant Taste. And that (no doubt) is caused, by the *Supplenesse* and *Gentlenesse* of the Juyce of that *Plant*, being that which maketh the *Boughes* also so Flexible. 610

It is reported by one of the *Ancients*, that their is a certaine *Indian* 611

Tree,

Tree, having few, but very great, *Leaves*, three Cubits long, and two broad; And that the *Fruit*, being of good Taste, groweth out of the *Barke*. It may be, there be *Plants*, that poure out the *Sap* so fast, as they have no leisure, either to divide into many *Leaves*, or to put forth *Stalks* to the *Fruit*. With us *Trees* (generally) have small *Leaves*, in comparison: The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the Least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaves* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Colewort*. The *Cause* is, (like to that of the *Indian Fig*,) the hasty and plentifull Putting forth of the *Sap*.

612 There bee three *Things* in use for *Sweetnesse*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little used. It is found in *Canes*: *Quære*, whether to the first *Knuckle*, or further up? And whether the very *Barke* of the *Cane* it selfe do yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I have heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Waxe*; And that hee hath knowne in the beginning of *May*, *Honey-Combs* empty of *Honey*; And within a forthnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported by some of the *Antients*, that there is a *Tree* called *Occhus*, in the Valleyes of *Hyrcania*, that distilleth *Honey* in the *Mornings*. It is not unlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may bee also, that some sweet Juyces, fit for many uses, may be concocted out of *Fruits*, to the Thicknesse of *Honey*, or perhaps of *Sugar*; The likeliest are *Rasins* of the Sunne, *Figs*, and *Corrans*: The Meanes may be enquired.

613 The *Ancients* report of a *Tree*, by the *Persian Sea*, upon the *Shore-Sands*, which is nourished with the *Salt-Water*; And when the *Tide* ebbeth, you shall see the *Roots*, as it were, bare without *Barke*, (being as it seemeth corroded by the *Salt*,) and grasping the *Sands* like a *Crab*; Which neverthelesse beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by setting them within the *Sands*.

614 There bee of *Plants*, which they use for *Garments*, these that follow. *Hempe*; *Flaxe*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter, commonly; And sometimes the *Downe* that groweth above.

615 They have, in some *Countries*, a *Plant* of a *Rosy Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that *Sleepeth*. There bee *Sleepers* enow then; For almost all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that have a *Mossy* or *Downy Root*; And likewise that have a Number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches* and *Impostours* make an ugly *Image*, giving it the Forme of a Face at the *Top* of the *Root*; and leave those *Strings* to make a broad *Beard* downe to the Foot. Also there is a Kinde of *Nard*, in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Doves* foot.

foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the Sap hasteneth most to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That besides the Putting forth upwards, and downwards, putteth forth in Round.

There are some *Teares* of *Trees*, which are kembed from the *Beards* of *Goats*: For when the *Goats* bite and crop them, especially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth upon their *Beards*: Of this Sort is some kinde of *Ladanum*. 617

The *Irrigation* of the *Plaine-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would bee tried likewise with *Roots*; For upon *Seeds* it worketh no great Effects. 618

The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessells*. But if the *Vessells* be not very Great, you must make some Holes in the Bottome, to give some Refreshment to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate. 619

The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thrive: Neither did it love the Sunne: There might bee one *Cause* of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quære* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things. 620

It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins* of *Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe devoure the *Pith* and *Marrow* of it, and so make it Hollow; But meddle not with the *Barke*, because to them it is bitter. 621

There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than wee know any; For there have beene *Cups* made of them, and an *Image* of *Jupiter*. But it is like they were *Wilde-Vines*; For the *Vines*, that they use for *Wine*, are so often Cut, and so much Digged and Dressed, that their *Sap* spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twigges*, while they are greene, so brittle, yet the *Wood* dryed is extreme Tough; And was used by the *Captaines* of *Armies*, amongst the *Romans*, for their *Cudgells*. 622

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading upon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make tryall, whether *Plants* that use to bee borne up by Props, will not put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Ivy*, *Wood-bine*, &c. 623

Quinces, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But because *Honey* (perhaps) will give them a Taste Over-lushious, 624

Infusion, it were good to make Triall in Powder of Sugar; Or in Syrrup of Wine onely Boyled to Height. Both these would likewise be tried in Orenges, Limons, and Pomgranates; For the Powder of Sugar, and Syrrup of Wine, will serve for more times than once.

625 The Conservation of Fruit would be also tried in Vessels, filled with fine Sand, or with Powder of Chalke; Or in Meale and Flower; Or in Dust of Oake-wood; Or in Mill.

626 Such Fruits, as you appoint for Long Keeping, you must gather before they be full Ripe; And in a Faire and Dry Day, towards Noone; And when the Winde bloweth not South; And when the Moone is under the Earth; And in Decrease.

627 Take Grapes, and hang them in an Empty Vessell, well Stopped; And set the Vessell, not in a Cellar, but in some dry Place; And it is said, they will last long. But it is reported by some, they will keepe better, in a Vessell halfe full of Wine, so that the Grapes touch not the Wine.

628 It is reported, that the Preserving of the Stalke, helpeth to preserve the Grape; Especially if the Stalke be put into the Pith of Elder, the Elder not touching the Fruit.

629 It is reported by some of the Ancients, that Fruit put in Bottles, and the Bottles let downe into Wells under Water, will keepe long.

630 Of Herbs and Plants, some are good to eat Raw; As Lettuce, Endive, Purslane, Tarragon, Cresses, Cucumbers, Muske-Melons, Radish, &c. Others onely after they are Boyled, or have Passed the Fire; As Parsley, Clary, Sage, Parsnips, Turnips, Asparagus, Artichoakes, (though they also being young are eaten Raw:) But a Number of Herbs are not Esculent at all; As Worme-Wood, Grasse, Greene-Corne, Centory, Hyssope, Lavender, Balme, &c. The Causes are, for that the Herbs, that are not Esculent, doe want the two Tastes, in which Nourishment resteth; Which are, Fat, and Sweet; And have (contrariwise) Bitter and Over-strong Tastes, or a Iuyce so Crude, as cannot be ripened to the degree of Nourishment. Herbes and Plants, that are Esculent Raw, have Fatnesse, or Sweetnesse, (as all Esculent Fruits;) Such are Onions, Lettuce, &c. But then it must be such a Fatnesse, (for as for Sweet Things, they are in effect alwayes Esculent,) as is not Over-grosse, and Loading of the Stomach; For Parsnips and Leeks have Fatnesse; But it is to Grosse and Heavy without Boyling. It must be also in a Substance somewhat Tender; For we see Wheat, Barley, Artichoakes, are no good Nourishment, till they have passed the Fire; But the Fire doth ripen, and maketh them soft and tender, and so they become Esculent. As for Radish, and Tarragon, and the like, they are for Condiments, and not for Nourishment. And even some of those Herbes, which are not Esculent, are notwithstanding Poculent; As Hop's, Broome, &c. Quære what Herbs are good for Drinke, besides the two aforenamed; For that it may (perhaps) ease the Charge of Brewing, if they make Beere to require lesse Malt, or make it last longer.

631 The Parts fit for the Nourishment of Man, in Plants, are; Seeds, Roots, and Fruits; But chiefly Seeds, and Roots. For Leaves, they give no Nourishment, at all, or very little: No more doe Flowers, or Blossomes, or Stalkes. The Reason is, for that Roots, and Seeds, and Fruits, (in as much as all Plants consist of an Oyly and Watry Substance commixed,) have more of the Oyly Substance; And Leaves, Flowers, &c. of the Watry. And secondly, they are more Concocted; For the Root, which continueth ever in the Earth, is still Concocted by the Earth; And Fruits, and Graines, (we see) are halfe a yeare, or more, in Concocting; Whereas Leaves are out, and Perfect in a Moneth.

632 Plants (for the most part) are more strong, both in Taste, and Smell, in the Seed, than in the Leafe, and Root. The Cause is, for that in Plants, that are not of a Fierce and Eager Spirit, the Vertue is increased by Concoction, and Maturation, which is ever most in the Seed; But in Plants, that are of a Fierce and Eager Spirit, they are stronger whilest the Spirit is enclosed in the Root; And the Spirits doe but weaken, and dissipate, when they come to the Aire, and Sunne; As we see it in Onions, Garlicke, Dragon, &c. Nay there be Plants, that have their Roots very Hot, and Aromaticall; And their Seeds rather Insipide; As Ginger. The Cause is (as was touched before,) for that the Heat of those Plants is very Dissipable; which under the Earth is contained and held in; But when it commeth to the Aire, it exhaleth.

633 The Iuyces of Fruits are either Watry, or Oyly. I reckon amongst the Watry, all the Fruits out of which Drinke is expressed; As the Grape, the Apple, the Peare, the Cherry, the Pomgranate, &c. And there are some others, which, though they be not in use for Drinke, yet they appeare to be of the same Nature; As Plums, Services, Mulberries, Rasps, Orenges, Limons, &c. And for those Iuyces, that are so fleshy, as they cannot make Drinke by Expression, yet (perhaps) they may make Drinke by Mixture of Water;

Poculaq; admistis imitantur vitea Sorbis.

And it may bee Heps and Brier-Berries would doe the like. Those that have Oyly Iuyce, are; Olives, Almonds, Nuts of all sorts, Pine-Apples, &c. And their Iuyces are all Inflammable. And you must observe also, that some of the Watry Iuyces, after they have gathered Spirit, will Burne and Enflame; As Wine. There is a Third Kinde of Fruit, that is sweet, without either Sharpnesse, or Oylinesse: Such as is the Fig, and the Date.

634 It hath beene noted, that most Trees, and specially those that beare Mast, are fruitfull but once in two yeares. The Cause (no doubt) is, the Expence of Sap; For many Orchard-Trees, well Cultured, will beare divers yeares together.

635 There is no Tree, which besides the Naturall Fruit, doth beare so many Bastard-Fruits, as the Oake doth: For besides the Acorne, it beareth Galls, Oake-Apples, and certaine Oake-Nuts, which are Inflammable; And certaine Oake-Berries, sticking close to the Body of the Tree, without Stalke. It beareth also Misseltoe, though rarely. The Cause of all these may bee, the Closenesse and Solidnesse of the Wood, and Pith of the Oake; Which maketh severall Iuyces finde severall Eruptions. And therefore,

if

if you will devise to make any *Super-Plants*, you must ever give the *Sap* Plentifull Rising, and Hard Issue.

636 There are two *Excrescences*, which grow upon *Trees*; Both of them in the Nature of *Muſhromes*: The one the *Romans* called *Boletus*; Which groweth upon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we have ſpoken before,) which groweth upon the Tops of *Oakes*; Though it be affirmed by ſome, that it groweth alſo at the *Roots*. I doe conceive, that many *Excreſcences* of *Trees* grow chiefly, where the *Tree* is dead, or faded. For that the *Naturall Sap* of the *Tree*, corrupteth into ſome *Preternaturall Subſtance*.

637 The greater Part of *Trees* beare *Moſt*, and *Beſt*, on the *Lower Boughes*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But ſome beare *Beſt* on the *Top-Boughes*; As *Crabs*, &c. Thoſe that beare beſt below, are ſuch, as Shade doth more good to, than Hurt. For generally all *Fruits* beare beſt loweſt; Becauſe the *Sap* tireth not, having but a ſhort Way: And therefore in *Fruits* ſpred upon *Walls*, the Loweſt are the Greateſt, as was formerly ſaid. So it is the *Shade* that hindereth the *Lower Boughes*; Except it bee in ſuch *Trees*, as delight in *Shade*; Or at leaſt beare it well. And therfore, they are either Strong *Trees*, as the *Oake*; Or elſe they have large *Leaves*, as the *Wallnut* and *Fig*; Or elſe they grow in *Pyramis*, as the *Peare*. But if they require very much *Sunne*, they beare beſt on the *Top*; As it is in *Crabs*, *Apples*, *Plums*, &c.

638 There be *Trees*, that beare beſt, when they begin to be *Old*; As *Almonds*, *Peaces*, *Vines*, and all *Trees* that give *Maſt*. The *Cauſe* is, for that all *Trees*, that beare *Maſt*, have an *Oyly Fruit*; And *Young Trees* have a more *Watry Iuyce*, and leſſe Concocted; And of the ſame kinde alſo is the *Almond*. The *Peare* likewiſe, though it be not *Oyly*, yet it requireth much *Sap*, and well Concocted; For wee ſee it is a Heavy *Fruit*, and Solide; Much more than *Apples*, *Plums*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it *is Young*; But *Grapes* that make better *Wine*, when it *is Old*; For that the *Iuyce* is better Concocted: And wee ſee that *Wine* is Inflammable; So as it hath a kinde of *Oylineſſe*. But the moſt Part of *Trees*, amongſt which are *Apples*, *Plums*, &c. beare beſt when they are *Young*.

639 There be *Plants*, that have a *Milke* in them, when they are Cut; As *Figs*, *Old Lettuce*, *Sow-Thiſtles*, *Spurge*, &c. The *Cauſe* may be an *Inception* of *Putrefaction*; For thoſe *Milkes* have all an *Acrimony*; though one would thinke they ſhould be *Lenitive*. For if you write upon Paper, with the *Milke* of the *Fig*, the Letters will not be ſeene, untill you hold the Paper before the Fire, and then they wax Browne; Which ſheweth that it is a Sharpe or Fretting *Iuyce*: *Lettuce* is thought Poyſonous, when it is *Old*, as to have *Milke*. *Spurge* is a kinde of Poyſon in it Selfe; And as for *Sow-Thiſtles*, though Coneyes eat them, yet Sheepe and Cattell will not touch them; And beſides, the *Milke* of them, rubbed upon Warts, in ſhort time, weareth them away: Which ſheweth the *Milke* of

of them to be *Corroſive*. We ſee alſo, that *Wheat*, and other *Corne ſowen*, if you take them forth of the *Ground*, before they ſprout, are full of *Milke*; And the Beginning of *Germination* is ever a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* alſo hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewiſe much *Acrimony*; For it cleanſeth the *Eyes*. It is good alſo for *Cataracts*.

640 *Muſhromes* are reported to grow, as well upon the *Bodies* of *Trees*, as upon their *Roots*, or upon the *Earth*: And eſpecially upon the *Oake*. The *Cauſe* is, for that ſtrong *Trees*, are towards ſuch *Excreſcences*, in the Nature of *Earth*; And therfore put forth *Moſſe*, *Muſhromes*, and the like.

641 There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Eare*; Except it bee the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Iſland Soquotra*: The *Herb Amaranthus*, (indeed,) is *Red* all over; And *Braſill* is *Red* in the *Wood*: And ſo is *Red Sanders*. That *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-loafe*. It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For wee ſee that *Grapes*, and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, leſſer towards the *Top*; Becauſe the *Iuyce* haſteneth not up; And beſides it is very *Aſtringent*, And therefore of Slow Motion.

642 It is reported, that *Sweet Muſſe*, beſides that upon the *Apple-Trees*, groweth likewiſe (ſometimes) upon *Poplars*; And yet (generally) the *Poplar* is a Smooth *Tree* of *Barke*, and hath little *Moſſe*. The *Moſſe* of the *Larix Tree* burneth alſo ſweet, and ſparkleth in the Burning. *Quære* of the *Moſſes* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloes*, &c.

643 The *Death* that is moſt without Paine, hath beene noted to be, upon the *Taking* of the *Potion* of *Hemlocke*, which in Humanity was the Forme of *Execution* of *Capitall Offenders* in *Athens*. The *Poyſon* of the *Aſpe*, that *Cleopatra* uſed, hath ſome affinity with it. The *Cauſe* is, for that the *Torments* of *Death* are chiefly raiſed by the Strife of the *Spirits*. And theſe *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extreme Old Man. I conceive it is leſſe Painfull than *Opium*, becauſe *Opium* hath Parts of *Heat* mixed.

644 There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*, So *Fennell-Seeds* are Sweet before they ripen, and after grow Spicy. And ſome never *Ripen* to bee *Sweet*; As *Tamarinds*, *Barberries*, *Crabs*, *Sloes*, &c. The *Cauſe* is, for that the former Kinde have much and ſubtill *Heat*, which cauſeth Early Sweetneſſe; The latter have a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can ſweeten. But as for the *Mirabolane*, it hath Parts of Contrary *Natures*; For it is *Sweet*, and yet *Aſtringent*.

645 There bee few *Herbes* that have a *Salt Taſte*, And contrariwiſe all *Blond* of *Living Creatures* hath a *Saltneſſe*: The *Cauſe* may bee, for that *Salt*, though it bee the *Rudiment* of *Life*, yet in *Plants* the Originall *Taſte* remaineth

remainethnot; For you shall have them *Bitter*, *Sower*, *Sweet*, *Biting*, but seldome *Salt*: But in *Living Creatures*, all those High *Tastes* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Oyly Nature*; which is not very Susceptible of those *Tastes*; And the *Saltnesse* it selfe of *Blood*, is but a light, and secret *Saltnesse*: And even among *Plants*, some doe participate of *Saltnesse*, as *Alga Marina*, *Samphire*, *Scorvy-Grasse*, &c. And they report, there is, in some of the *Indian Seas*, a *Swimming Plant*, which they call *Salgazus*, spreading over the *Sea*, in such sort, as one would thinke it were a *Meedow*. It is certaine, that out of the *Ashes* of all *Plants*, they extract a *Salt*, which they use in *Medicines*.

646 It is reported by one of the *Ancients*, that there is an *Herb* growing in the *Water*, called *Lineastis*, which is full of *Prickles*: This *Herb* putteth forth another small *Herb* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered betweene the *Prickles*, which Putrified by the *Sunne*, Germinateth. But I remember also I have seene, for a great Rarity, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top and Top-gallants*.

647 *Barley*, (as appeareth in the *Malting*,) being steeped in *water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned upon a dry floare, will sprout, halfe an Inch long at least: And if it bee let alone, and not turned, much more; untill the Heart bee out. *Wheat* will doe the same. Try it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Grain*, and *Semper Vive*; For there it is of the old Store, to no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would bee further driven: For it appeareth already, by that which hath beene said, that *Earth* is not necessary to the first Sprouting of *Plants*. And wee see that *Rose-Buds* set in *Water*, will Blow: Therefore try whether the *Sprouts* of such *Grasses* may not be raised to a further Degree; As to an *Herb*, or *Flower*, with *Water* onely; Or some small commixture of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Mole*, and of the *Roses*, that they will come far sooner on in *Water*, than in *Earth*. For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may give some light also, that *Drinke* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drinke* together. Try the same *Experiment* with *Roots*, as well as with *Grasses*; as for Example, take a *Turnip*, and scare it a little, and then dry it, and see whether it will sprout.

648 *Malt* in the *Dressing* will swell: And that in such a manner, as after the Putting forth in Sprouts, and the drying upon the Kiele, there will be gained at least a Bushell in eight, and yet the Sprouts are rubbed off; And there will be a Bushell of *Dust* besides the *Malt*: Which I suppose to be, not onely by the loose, and open Laying of the *Parts*, but by some Addition of *Substance*, drawne from the *Water*, in which it was steeped.

649 *Malt* giveth a *Sweetnesse* to the *Taste*, which appeareth yet more in

in the *Wort*. The *Dulceration* of *Things* is worthy to be tried to the full; For that *Dulceration* importeth a degree to *Nourishment*: And the Making of *Things Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*.

Most *Seeds* in the Growing, leave their *Huske* or *Rinde* about the *Root*; 650
But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The *Cause* may be, for that the *Skin* or *Huske* is not easie to breake; As we see by the Pilling of *Onions*, what a Holding *Substance* the *Skin* is.

Plants, that have *Curled Leaves*, doe all abound with *Moysture*; Which 651
commeth so fast on, as they cannot spread themselves Plaine, but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne, and *Cabbage-Lettuce*.

It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Putrified*, 652
though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like Hard *Sugar*.

The *Roots* of *Trees* doe, (some of them,) put downwards deepe into 653
the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*; As the *Ash*, *Cypresse-Tree*, *Olive*, &c. The *Cause* of this latter may be, for that such *Trees* as love the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot vp much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason, under *Ground*, to avoid Recesse from the *Sunne*, maketh them spread the more. And wee see it commeth to passe in some *Trees*, which have beene planted too deep in the *Ground*, that for love of Approach to the *Sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And we see also, that the *Olive* is full of *Oylie Iuyce*; And *Ash* maketh the best Fire; And *Cypresse* is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loveth the *Earth*; And therefore 654
groweth slowly. And for the *Pine*, and *Firre* likewise; they have so much *Heat* in themselves, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also that have the same difference; As the *Herb* they call *Morsus Diaboli*; which putteth the *Root* downe so low, as you cannot pull it up without *Breaking*; Which gave Occasion to the *Name*, and *Fable*; For that it was said, it was so wholsome a *Root*, that the *Devill*, when it was gathered, bit it for *Envy*; And some of the *Ancients* doe report, that there was a Goodly *Firre*, (which they desired to remove whole,) that had a *Root* under *Ground* eight Cubits deepe; And for the *Root* came up broken.

It hath beene observed, that a *Branch* of a *Tree*, being *Vnbarked* some 654
space at the Bottome, and so set into the *Ground*, hath growen, even of such *Trees*, as if the *Branch* were set with the *Barke* on, they would not grow: yet contrariwise we see, that a *Tree* Pared round in the *Body*, above

Ground, will die. The *Cause* may be, for that the *Unbarkt Part* draweth the Nourishment best, but the *Barke* continueth it only.

655 *Grapes* will continue *Fresh*, and *Moist*, all Winter long, if you hang them, *Cluster* by *Cluster*, in the *Roofe* of a *Warme Roome*; Especially, if when you gather the *Cluster*, you take off with the *Cluster* some of the *Stocke*.

656 The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath these Properties; That it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughs*, though many *Stalks* come out of one *Root*. It differeth much in greatnesse; The smallest being fit for Thatching of Houses; And Stopping the Chinkes of Ships; Better than Glew, or Pitch. The Second Bignesse, is used for Angle Rods, and Staves; And in *China* for beating of Offenders upon the Thighs. The differing *Kinds* of them are; The *Common Reed*; The *Cassia Fistula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *Water*, it draweth most Nourishment from *Water*; which maketh it the *Smoothest* of all others in *Barke*; And the *Hollowest* in *Body*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thick*; As *Apple*. Some *Gummy*; as *Cherries*. Some *Frothie*, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* only; For if you cut the *Tree* a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be drie. The *Trees*, which have the *Moistest Juyces* in their *Fruit*, have commonly the *Moistest Sap* in their *Body*; For the *Vines* and *Peares* are very *Moist*; *Apples* somewhat more *Spongie*: The *Milke* of the *Figge* hath the Qualitie of the *Rennet*, to gather *Cheese*: And so have certaine *Sowre Herbs* wherewith they make *Cheese* in *Lent*.

658 The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*; And it is a good Triall, to trie it by Speaking at one End, and Laying the Eare at the Other; For if it be *Knottie*, the Voice will not passe well. Some have the *Veines* more varied and Chamloted; As *Oake*, whereof *Wainscot* is made; *Maple*, whereof *Trenchers* are made: Some more smooth, as *Firre*, and *Walnut*: Some doe more easily breed *Wormes* and *Spiders*; Some more hardly, as it is said of *Irish Trees*: Besides there bee a Number of Differences that concerne their Use; As *Oake*, *Ceder*, and *Chesnut*, are the best Builders: Some are best for *Plough-Timber*; As *Ash*; Some for *Peeres*, that are sometimes wet, and sometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Deskes*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moist Grounds*; For that maketh the *Timber* Tough, and not apt to rift with *Ordnance*; Wherein *English* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre*, and *Pine*, because of their

Length,

Length, Straightnesse, and Lightnesse: Some for *Pale*; As *Oake*: Some for *Fuell*; As *Ash*: And so of the rest.

659 The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casuall*: For many have beene translated, and have prospered well; As *Damaske-Roses*, that have not beene knowne in *England* above an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerely *Naturall*; As the *Firre* and *Pine* love the Mountaines; The *Poplar*, *Willow*, *Sallow*, and *Alder*, love *Rivers*, and *Moist Places*; The *Ash* loveth *Coppices*; But is best in *Standards* alone: *Juniper* loveth *Chalke*; And so doe most *Fruit-Trees*; *Sampire* groweth but upon *Rocks*: *Reeds* and *Osiers* grow where they are washed with *Water*: The *Vine* loveth Sides of *Hills*, turning upon the *South-East-Sunne*, &c.

660 The *Putting forth* of certaine *Herbs* discovereth of what Nature the *Ground* where they put forth, is: As *Wilde Thyme* sheweth good *Feeding Ground* for *Cattell*: *Betony* and *Strawberries* shew *Grounds* fit for *Wood*: *Camomill* sheweth Mellow *Grounds* fit for *Wheat*. *Mustard-Seed*, growing after the *Plough*, sheweth a good *Strong Ground* also for *Wheat*: *Burnet* sheweth good *Meadow*: And the like.

661 There are found, in divers *Countries*, some other *Plants*, that grow out of *Trees*, and *Plants*, besides *Missetoe*: As in *Syria*, there is an *Herb* called *Cassytas*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Fannos*, upon the *Wilde Olive*. And an *Herbe* called *Hippophaeston* upon the *Fullers Thorne*; Which, they say, is good for the *Falling-Sicknesse*.

662 It hath beene observed, by some of the *Ancients*, that howsoever *Cold* and *Easterly Winds*, are thought to be great Enemies to *Fruit*; yet neverthelesse *South-Winds* are also found to doe Hurt; Especially in the *Blossoming* time; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West winds* are the best. It hath beene observed also that *Greene* and *Open Winters* doe hurt *Trees*; Insomuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will dye. The *Cause* is the same with the former, because the *Lust* of the *Earth* overspendeth it selfe; Howsoever some other of the *Ancients* have commended *warme Winters*.

663 *Snowes*, lying long, cause a *Fruitfull Yeare*, For first, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Teat*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture*; For it is the *Froth* of the *Cloudy Waters*.

664 *Showers*, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits*; As *Vines*, *Olives*, *Pomegranates*; Yet it is rather for Plenty, than for Goodnesse; For the best *Wines* are in the Driest *Vintages*: *Small Showers* are likewise good for *Corne*, so as

Patching

Parching Heats come not upon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *Sunne* followeth not so fast upon them: and we see, even in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Evening*.

665 The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently inquired. The *Earth*, that with *Showers* doth easiliest *Soften*, is commended; And yet some *Earth* of that kinde will be very Dry, and Hard before the *Showers*. The *Earth* that casteth up from the *Plough*, a great *Clod*, is not so good, as that, which casteth up a Smaller *Clod*. The *Earth*, that putteth forth *Mosse* easily, and may bee called *Mouldie*, is not good. The *Earth*, that smelleth well upon the Digging, or Ploughing, is commended; As containing the *Iuice* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-bowes*, fall more upon one kinde of *Earth* than upon another: As it may well bee; For that that *Earth* is most *Roscide*: And therfore it is commended for a Signe of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *Withered*, or *Blasted* at the Top, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, wherein the *Grasse* is soone *Parched* with the *Sun*, and *Toasted*, is commonly *Forced Earth*, and Barren in his owne Nature. The *Tender*, *Chessome*, and *Mellow Earth*, is the best; Being meere *Mould*, betweene the two Extreames of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Ploughed*, is commonly *Fruitfull*; For in it is *Closing*, and full of *Iuice*.

666 It is strange, which is observed by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnesse* of *Trees*; and of *Vines*, by name: Insomuch as they cast Dust upon them of purpose. It should seeme, that that Powdring, when a Shower commeth, maketh a kinde of Soyling to the *Tree*, being *Earth* and *water*, finely layd on. And they note, that Countries, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667 It is commended by the *Ancients*, for an Excellent *Helpe* to *Trees*, to lay the *Stalkes* and *Leaves* of *Lupines* about the *Roots*; Or to Plough them into the *Ground*, where you will sow *Corne*: The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them upon *land*, doth much Good. And it was generally received of old, that *Dunging* of *Grounds*, when the *West Wind* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more thirsty, and open, to receive the *Dung*.

668 The *Grafting* of *Vines* upon *Vines*, (as I take it,) is not now in use: The *Ancients* had it, and that three wayes: The first was *Insition*, which is the Ordinary manner of *Grafting*: The Second was *Terebration*, through the *Middle* of the *Stocke*, and putting in the *Cions* there: And the Third was Paring of two *Vines*, that grow together, to the *Marrow*, and Binding them close.

669 The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And

And would be more worthy to be enquired, if it were in Mens Power to help them; Whereas many of them are not to be remedied. The *Mill-dew* is one of the Greatest; which (out of question) commeth by *Closenesse* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it seldome commeth; Such as is with us *York's Would*. This cannot be remedied, otherwise than that in *Countries* of Small Enclosure, the *Grounds* be turned into larger *Fields*: Which I have knowne to doe good in some Farmes. Another *Disease* is the *Putting forth* of *Wilde Oats*, whereinto *Corne* oftentimes, (especially *Barley*,) doth degenerate. It happeneth chiefly from the *Weaknesse* of the *Graine* that is sowen; For if it be either too Old, or Mouldy, it will bring forth *Wilde Oats*. Another *Disease* is the *Sacietie* of the *Ground*; For if you sow one *Ground* still with the same *Corne*, (I meane not the same *Corne* that grew upon the same *Ground*,) but the same *Kinde* of *Graine*; (As *Wheat*, *Barley* &c. it will prosper but poorely: Therefore besides the *Resting* of the *Ground*, you must varie the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times; At the *Flowring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with us is rare; But in Hotter *Countries*, common: Insomuch as the Word, *Calamitas*, was first derived from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Over-wet* at *Sowing-Time*; which with us breedeth much *Dearth*; Insomuch as the *Corne* never commeth up; And (many times) they are forced to resow *Sommer-Corne*, where they sowed *Winter-Corne*. Another ill *Accident* is *Bitter Frosts*, continued, without *Snow*; Especially in the Beginning of the *Winter*, after the *Seed* is new Sowen. Another *Disease* is *Wormes*; which sometimes breed in the *Root*, and happen upon Hot *Sunnes*, and *Showers*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Especially when *Hot Sunnes* breake often out of *Clouds*. Another *Disease* is *Weeds*; And they are such, as either Choake, and Overshadow the *Corne*, and beare it downe; Or starve the *Corne*, and deceive it of Nourishment. Another *Disease* is, *Over-Rankenesse* of the *Corne*; Which they use to remedy, by *Mowing it* after it is come up; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Harvest*. Another ill *Accident* is, if the *Seed* happen to have touched *Oyle*, or any *Thing*, that is *Fat*; For those *Substances* have an *Antipathy* with *Nourishment* of *Water*.

The *Remedies* of the *Diseases* of *Corne* have beene observed as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preservative*: The *Mingling* of *Seed-Corne* with *Ashes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* sound: It hath not beene practised, but it is thought to be of use, to make some *Miscellane* in *Corne*; As if you sow a few *Beanes* with *Wheat*, your *Wheat* will be the better. It hath been observed, that the *Sowing* of *Corne* with *Housleeke*, doth good. Though *Graine*, that 670

toucheth *Oyle*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oyle*, when it beginneth to Putrifie, (which they call *Amurca*,) is thought to assure it against *Wormes*. It is reported also, that if *Corne* be *Mowed*, it will make the *Graine* Longer, but Emptier, and having More of the *Houke*.

671 It hath beene noted, that *Seed* of a yeare old, is the Best; And of two or three yeares is worse; And that which is more Old, is quite Barren; Though (no doubt) some *Seeds* and *Graines* last better than others. The *Corne*, which in the *Vanning* lieth lowest, is the best; And the *Corne*, which broken or bitten retaineth a little *Yellownesse*, is better than that which is very *White*.

672 It hath beene observed, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth*; Insomuch as it hath bin knowne to go three Cubits deepe; And that it is the *Root* that continueth fit (longest) to be set againe, of any *Root* that groweth. It is a *Cold* and *Acide Herb*, that (as it seemeth) loveth the *Earth*, and is not much drawne by the *Sunne*.

673 It hath beene observed, that some *Herbs* like best, being watred with *Salt-Water*; And *Radish*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674 It is strange that is generally received, how some *Poysonous Beasts* affect *Odorate* and *Wholsome Herbs*; As that the *Snake* loveth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other Coverture, that they take liking in, than the Vertue of the *Herb*.

675 It were a Matter of great Profit, (save that I doubt it is too Conjecturall to venture upon,) if one could discerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the Yeare: For as for those, that are like to bee in *Plenty*, they may be bargained for, upon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to bee rich; when he fore-saw a great *Plenty* of *Olives*, made a *Monopoly* of them. And for *Scarcity*, Men may make Profit in keeping better the Old Store. Long *Continuance* of *Snow* is beleeved to make a *Fruitfull Yeare* of *Corne*: An *Early Winter*, or a very *Late Winter*, a *Barren Yeare* of *Corne*: An Open and Serene *Winter*, an ill Yeare of *Fruit*: These we have partly touched before: But other *Prognostickes* of like Nature are diligently to bee enquired.

676 There seeme to be, in some *Plants*, *Singularities*, wherein they differ from al Others; The *Olive* hath the *Oyly Part*, only on the *Outside*; Wherein all other *Fruits* have it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines* *Kernells*. The *Pomegranate* and *Pine-Apple* have onely, amongst *Fruits*, *Grained* distinct in severall *Cells*. No *Herbs* have *Curled Leaves*, but *Cabbage*, and *Cabbage-Lettuce*. None have double *Leaves*, one belong to the

the *Stalke*, another to the *Fruit* or *Seed*, but the *Artichoke*. No *Flower* hath that kinde of Spread that the *Woodbine* hath. This may be a large Field of Contemplation; For it sheweth that in the Frame of *Nature*, there is, in the Producing of some *Species*, a Composition of Matter, which happeneth oft, and may be much diversified: In others, such as happeneth rarely, and admitteth little Variety: For so it is likewise in *Beasts*: *Dogs* have a Resemblance with *Wolves*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Buffles*; *Hares* with *Conyes*; &c. And so in *Birds*: *Kites* and *Kestrells* have a Resemblance with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black-Birds* with *Thrushes*, and *Mavisses*; *Crowes* with *Ravens*; *Dawes*, and *Choughes*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird* of *Paradise*, and the *Peacocke* amongst *Birds*; And some few others; have scarce any other *Species*, that have Affinity with them.

We leave the *Discription* of *Plants*, and their *Vertues*, to *Herballs*, and other like *Bookes* of *Naturall History*: Wherein *Mens Diligence* hath beene great, even to *Curiosity*: For our *Experiments* are only such, as doe ever ascend a Degree to the *Deriving* of *Causes*, and *Extracting* of *Axiomes*, which, wee are not ignorant, but that some, both of the *Ancient*, and *Moderne Writers*, have also laboured; But their *Causes*, and *Axiomes*, are so full of Ignmagination, and so infected with the old Received *Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

Experiment Solitary, touching *Healing of Wounds*.

677 IT hath beene observed, by some of the *Ancients*, that *Skins*, (especially of *Rames*,) newly pulled off, and applied to the *Wounds* of *Stripes*, doe keepe them from Swelling, and Exulcerating; And likewise Heale them, and Close them up; And that the *Whites* of *Eggs* doe the same. The *Cause* is a Temperate *Conglutination*; For both *Bodies* are Clammy, and Viscous, and doe bridle the *Defluxe* of *Humours* to the Hurts, without Penning them in too much.

Experiment Solitary, touching *Fat* diffused in *Flesh*.

678 YOu may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into Peeces, & put the Peeces into a *Glasse* covered with Parchment; And so let the *Glasse* stand six or seven Houres in *Boyling Water*. It may be and *Experiment* of Profit, for Making of *Fat*, or *Grease*, for many uses; But then it must be of such *Flesh* as is not Edible; As *Horses*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

Experiment Solitary, touching *Ripening of Drinke before Time.* 679

IT is reported by one of the *Ancients*, that *New Wine*, put into *Vessells* well stopped, and the *Vessells* let down into the *Sea*, will accelerate very much the Making of them Ripe, and Potable. The same would be tried in *wort*.

Experiment Solitary, touching *Pilositie* and *Plumage.* 680

Beasts are more *Hairy* than *Men*; And *Savage Men* more than *Civill*; And the *Plumage* of *Birds* exceedeth the *Pilosity* of *Beasts*. The *Cause* of the Smoothnesse in *Men*, is not any Abundance of *Heat*, and *Moisture*, though that indeed causeth *Pilosity*; But there is requisite to *Pilosity*, not so much *Heat* and *Moisture* as *Excrementitious Heat* and *Moisture*: (For whatsoever assimilateth, goeth not into the *Haire*:) And *Excrementitious Moisture* aboundeth most in *Beasts*, and *Men* that are more *Savage*. Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* assimilate lesse, and excerne more than *Beasts*: For their *Excrements* are ever liquid, and their *Flesh* (generally) more dry: Beside, they have not *Instruments* for *Urine*; And so all the *Excrementitious Moisture* goeth into the *Feathers*: And therefore it is no Marvell, though *Birds* bee commonly better Meat than *Beasts*, because their *Flesh* doth assimilate more finely, and secerneth more subtilly. Againe, the *Head* of *Man* hath *Haire* upon the *first Birth*, which no other *Part* of the *Body* hath. The *Cause* may bee *Want* of *Perspiration*: For Much of the Matter of *Haire*, in the other *Parts* of the *Body*, goeth forth by Insensible *Perspiration*; And besides, the *Skull* being of a more solide Substance, nourisheth and assimilateth lesse, and excerneth more: And so likewise doth the *Chinne*; We see also that *Haire* commeth not upon the *Palmes* of the *Hands*, nor *Soales* of the *Feet*, Which are *Parts* more *Perspirable*. And *Children* likewise are not *Hairy*, for that their *Skins* are more *Perspirable*.

Experiment Solitary, touching the *Quicknesse of Motion in Birds.* 681

Birds are of *Swifter Motion* than *Beasts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beasts*. The *Cause* is, for that the *Spirits* in *Birds*, are in greater Proportion, in comparison of the Bulke of their Body, than in *Beasts*: For as for the Reason that some give, that they are partly Carried, whereas *Beasts* goe, that is Nothing; For by that Reason Swimming should be swifter, than Running: And that Kinde of *Carriage* also, is not without Labour of the *Wing*.

Experiment Solitary, touching the different *Clearenesse* of the *Sea.* 682

THe *Sea* is *Clearer*, when the *North-Wind* bloweth, than when the *South-Wind*. The *Cause* is, for that *Salt-Water* hath a little *Oylinesse* in the *Surface* thereof; As appeareth in verie Hot Dayes: And againe, for that the *Southerne wind* relaxeth the *Water* somewhat; As no *Water Boyling* is so Cleare as *Cold water*.

Experiment Solitary, touching the different *Heats of Fire* and *Boyling Water.* 683

FIre burneth *Wood*, making it first *Luminous*; Then *Black* and *Brittle*; And lastly, *Broken* & *Incinerate*: *Scalding Water* doth none of these. The *Cause* is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, and then *Emitted*; Whereof the *Refining*, or Attenuation causeth the *Light*; And

And the *Emission*, first the *Fragilitie*, and after the *Dissolution* into *Ashes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* so much; And besides Part of the *Water* entreth; Which doth increase the *Spirit*, and in a degree extinguish it: Therfore we see that *Hot Water* will quench *Fire*. And againe we see, that in *Bodies*, wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*; (into which the *Water* entreth not at all;) there is scarce difference to bee discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

Experiment Solitary, touching the *Qualification* of *Heat* by *Moisture.* 684

THe *Bottome* of a *Vessel* of *Boiling Water*, (as hath bin observed,) is not very much *Heated*; So as Men may put their *Hand* under the *Vessel*, and remove it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth Coales, where it entreth; So it doth allay Heat, where it toucheth: And therfore note well, that *Moisture*, although it doth not passe thorow *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe;) yet it worketh manifest Effects; not by Entrance of the Body, but by Qualifying of the Heat, and Cold; As wee see in this *Instance*: And we see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*,) differeth not much from the *Water* of *Things Distilled* by *Fire*: Wee see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will: Nay she see more, that *Butter*, or *Oile*, which in themselves are Inflammable, yet by Vertue of their *Moisture*; will doe the like.

Experiment Solitary, touching *Yawning.* 685

IT hath beene noted by the *Ancients*, that it is dangerous to Pick ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the Inner *Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

Experiment Solitary, touching the *Hiccough.* 686

IT hath beene observed by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough* is a *Lifting up* of the *Stomacke*; which *Sneezing* doth somewhat depresse, and divert the *Motion* another way. For first we see, that the *Hiccough* commeth of *Fulnesse* of *Meat*, (especially in *Children*,) which causeth an Extension of the *Stomacke*: Wee see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomacke*: And this *Motion* is ceased either by *Diversion*; Or by *Detention* of the *Spirits*: *Diversion*, as in *Sneezing*; *Detention*, as we see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a Man into an Earnest Study doth the like: As is commonly used: And *Vinegar* put to the *Nosthrills*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibiteth the *Motion* of the *Spirits*.

Experiment Solitary, touching Sneezing. 687

Looking against the *Sunne*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nostrils*; For then the *Holding* up of the *Nostrills* against the *Sunne*, though one Winke, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Nostrills*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Nostrills* within, doth draw the *Moisture* to the *Nostrills*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene observed, that if one be about to *Sneeze*, the Rubbing of the *Eyes*, till they run with Water, will prevent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Nostrills*, is diverted to the *Eyes*.

Experiment Solitary touching the *Tenderneſſe* of the *Teeth*. 688

THe *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cause* is double: The One, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Fleſh*; for that the *Fleſh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth* are *Parts* without *Bloud*; Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we see, that the *Sinnewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in Sharpe *Colds* wax *Brittle*: And therefore it hath beene seene, that all *Contusions* of *Bones*, in *Hard Weather*, are more difficult to Cure.

Experiment Solitary, touching the *Tongue*. 689

IT hath beene noted, that the *Tongue* receiveth, more easily, *Tokens* of *Diseases*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blackneſſe* of the *Tongue*. Againe, *Pied Cattell* are spotted in their *Tongues*, &c. The *Cause* is, (no doubt,) the *Tenderneſſe* of the *Part*, which thereby receiveth more easily all *Alterations*, than any other *Parts* of the *Fleſh*.

Experiment Solitary, touching the *Taſte*. 690

WHen the *Mouth* is out of *Taſte*, it maketh Things taſte, sometimes *Salt*; Chiefely *Bitter*; And sometimes *Loathsome*; But never *Sweet*. The *Cause* is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathsome*; But *Sweet* never; For the rest are *Degrees* of *Corruption*.

Experiment Solitary, touching some *Prognostick* of *Pestilentiall Seasons*. 691

IT was observed in the *Great Plague* of the last Yeare, that there were seene, in divers *Ditches*, and low *Grounds*, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the least; Whereas *Toads* (usually) have no *Tailes* at all. Which argueth a great Disposition to *Putrefaction* in the *Soile*, and *Aire*. It is reported likewise, that *Roots*, (such as *Carrets*, and *Parsnips*,) are more *Sweet*, and *Lushious*, in Infectious Yeares, than in other Yeares.

Experiment Solitary, touching *Speciall Simples* for *Medicines*. 692

WIse *Physitians* should with all diligence inquire, what *Simples* Nature yeeldeth, that have extreme *Subtile Parts*, without any *Mordication*,

dication, or *Acrimony*: For they undermine that which is *Hard*; They open that which is *Stopped*, & *Shut*; And they expell that which is *Offensive*, gently, without too much *Perturbation*. Of this Kind are *Elder-flowers*, which therefore are Proper for the *Stone*: Of this Kinde is the *Stone-Pine*; which is Proper for the *Iaundice*: Of this Kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this Kinde is *Piony*: which is Proper for *Stoppings* in the *Head*: Of this Kinde is *Fumitory*; which is Proper for the *Spleene*: And a Number of others. Generally, divers *Creatures* bred of *Putrefaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Snailes*, &c. And I conceive, that the *Trochiſchs* of *Vipers*, (which are so much magnified) and the *Fleſh* of *Snakes* some wayes condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts* of *Beasts Putrified*; (as *Castoreum*, and *Muske*, which have extreme *Subtill Parts*,) are to be placed amongst them. We see also that *Putrefactions* of *Plants*, (as *Agaricke*, and *Iewes-Eare*,) are of greatest Vertue. The *Cause* is, for that *Putrefaction* is the Subtilest of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take down the *Lives* of *Living Creatures*, (which some of the *Paracelsians* say (if they could bee taken downe,) would make us *Immortall*;) the Next is for *Subtilty* of *Operation*, to take *Bodies Putrefied*; Such as may be safely taken.

Experiments in Consort touching *Venus* 693

IT hath beene observed by the *Ancients*, that *Much Vſe* of *Venus* doth *Dimme* the *Sight*; And yet *Eunuchs*, which are unable to generate are (nevertheleſſe) also *Dimme Sighted*. The *Cause* of *Dimneſſe* of *Sight*, in the Former, is the *Expence* of *Spirits*: In the Latter, the *Over-moisture* of the *Braine*: For the *Over-moisture* of the *Braine* doth thicken the *Spirits Visuall*, and obstructeth their Passages; As we see by the Decay, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurreth as another *Cause*: we see also that *Blindneſſe* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moisture*; As the Swelling of their Thighes, the Looseneſſe of their Belly, the Smoothneſſe of their Skinne, &c.

694

The *Pleasure* in the *Act* of *Venus*, is the greatest of the *Pleasures* of the *Senſes*; The Matching of it with *Itch* is unproper; though that also be Pleasing to the touch. But the *Causes* are Profound. First, all the *Organs* of the *Senſes* qualifie the *Motions* of the *Spirits*; And make so many Severall *Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diversities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taſte*, and *Smell*, are of severall frame; And so are the Parts for Generation. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *sixth Senſe*; And if there were any other differing *Organs*, and Qualified *Perforations*, for the *Spirits* to passe, there would be more than the *Five Senſes*: Neither doe wee well know, whether some *Beasts*, and *Birds*, have not *Senſes* that we know not; And the very *Sent* of *Dogs* is almost a *Senſe* by it selfe. Secondly, the *Pleasures* of the *Touch* are greater and deeper

deeper, than those of the other *Senses*; As we see in *Warming* upon *Cold*; Or *Refrigeration* upon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits immediately*, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *Wine*, and the like *Sweet Vapours*. For *Smells*, we see their great and sudden Effect in fetching *Men* againe, when they swoune: For *Drinke*, it is certaine, that the *Pleasure* of *Drunkennesse*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* move, and touch themselves: And the *Pleasure* of *Venus* is somewhat of the same Kinde.

995 It hath beene alwayes observed, that *Men* are more inclined to *Venus* in the *winter*, and *Women* in the *Summer*. The *Cause* is, for that the *Spirits*, in a *Body* more Hot and Dry, as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Womens* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the *Vse* of *Venus*, in *Moist* and *well habituate Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The Reason is evident; For that it is a Principall *Evacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Evacuation*, but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments in Consort touching the *Insecta*.

The *Nature* of *Vivification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceived, in Small, than in Great; and in unperfect, than in perfect; and in Parts, than in whole: So the *Nature* of *Vivification* is best enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Discloſing* the *Originall* of *Vivification*. Secondly, in *Discloſing* the *Original* of *Figuration*. Thirdly, in *Discloſing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lye more hidden. And Fourthly, in *Traducing*, by way of *Operation*, some *Observations* in the *Insecta*, to worke *Effects* upon *Perfect Creatures*. Note that the word *Insecta* agreeth not with the Matter, but we ever use it for Brevities sake, intending by it *Creatures bred of Putrefaction*.

696 The *Insecta* are found to breed out of severall *Matters*: Some breed of *Mud*, or *Dung*; As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth Putrifie, as not able to Preserve it selfe: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefactions*

ons of *Nourishment*. Some breed in *Wood*, both Growing, and Cut downe. *Quære* in what *Woods* most, & at what Seasons? We see that the *Wormes* with many Feet, which round themselves into Balls, are bred chiefly under *Logs* of *Timber*, but not in the *Timber*; And they are said to be found also, (many times,) in *Gardens*, where no *Logs* are. But it seemeth their *Generation* requireth a *Coverture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therfore they are not *Venomous*, but (contrariwise) are held by the *Physitians* to clarifie the *Bloud*. It is observed also that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Haire* of *Living Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* close kept, and somewhat arefied by the *Haire*. The *Excrements* of *Living Creatures*, do not only breed *Insecta*, when they are Excerned, but also while they are in the *Body*; As in *Wormes*, whereto Children are most subject, and are chiefly in the Guts. And it hath beene lately observed by *Physitians*, that in many *Pestilent Diseases*, there are *Wormes* found in the upper Parts of the Body, where *Excrements* are not, but onely *Humours Putrified*. *Fleas* breed Principally of *Straw* or *Mats*, where there hath beene a little *Moisture*; Or the *Chamber* and *Bed-straw* kept close, and not Aired. It is received that they are killed by Strewing *Worme-wood* in the *Rooms*. And it is truly observed, that *Bitter Things* are apt, rather to kill, than engender *Putrefaction*; And they be *Things*, that are *Fat*, or *Sweet*, that are aptest to *Putrifie*. There is a *Worme*, that breedeth in *Meale*, of the shape of a large white *Maggot*, which is given as a great Daintie to *Nightingales*. The *Moath* breedeth upon *Cloth*, and other *Lanifices*; Especially if they be laid up dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worme* called a *Wevill*, bred under *Ground*, and that feedeth upon *Roots*; As *Parsnips*, *Carrets*, &c. Some breed in *Waters*, especially shaded, but they must be *Standing-waters*; As the *Water-Spider*, that hath six Legs. The *Fly* called the *Gad-fly*, breedeth of somewhat that Swimmeth upon the Top of the *Water*, and is most about *Ponds*. There is a *Worme* that breedeth of the *Dregs* of *Wine Decayed*; which afterwards, (as is observed by some of the *Ancients*,) turneth into a *Gnat*. It hath been observed by the *Ancients*, that there is a *Worme* that breedeth in old *Snow*, and is of Colour Reddish, and dull of Motion, and dieth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hardly Vivifie. And the Reason of the Dying of the *Worme*, may be the sudden Exhaling of that little *Spirit*, as soone as it commeth out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benummed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserved in *Cold*. It is affirmed both by *Ancient* and *Moderne Observation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites*, (which is *Vitriol*,) is often cast in, to mend the working, there riseth suddenly a *Fly*, which sometimes moveth, as if it tooke hold on the walls of the *Furnace*; Sometimes is seene moving in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well

Violent Heat of Fire, as the *Gentle Heat* of *Living Creatures*, will Vivifie, if it have Matter Proportionable. Now the great *Axiome* of *Vivification* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; *Matter Viscous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be *put forth*, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soone as ever it cooleth never so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will Put forth and germinate, as we see in *Chymicall* Trialls. Briefly, most *Things Putrified* bring forth *Insecta* of severall Names; But wee will not take upon us now, to Enumerate them all.

697 The *Insecta* have beene noted by the *Ancients*, to feed little: But this hath not beene diligently observed; For *Grashoppers* eat up the *Greene* of whole *Countries*; And *Silke-wormes* devoure *Leaves* swiftly; And *Ants* make great Provision. It is true, that *Creatures*, that Sleepe and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* have Extreme Varietie, but the *Similar Parts* little. It is true, that they have, (some of them,) a *Diaphragme*, and an *Intestine*; And they have all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *long Life*: Yet *Bees* have beene knowne to live seven yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to live till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will live and grow verie long: And those that Enterchange from *Wormes* to *Flyes* in the *Summer*, and from *Flyes* to *Wormes* in the *Winter*, have been kept in Boxes foure yeares at the least. Yet there are certaine *Flyes*, that are called *Ephemera*, that live but a day. The *Cause* is, the Exilitie of the *Spirit*; Or perhaps the Absence of the *Sunne*; For that if they were brought in, or kept close, they might live longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*,) revive easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the *Easie Dilating* of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in Peeces; Which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698 The *Insecta* have *Voluntarie Motion*, and therefore *Imagination*; And whereas some of the *Ancients* have said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently observed; For *Ants* goe right forwards to their Hills; And *Bees* doe (admirably) know the way, from a Flowrie Heath, two or three Miles off, to their Hives. It may be, *Gnats*, and *Flyes*, have their *Imagination* more mutable, and giddy, as *Small Birds* likewise have. It is said by some of the *Ancients*, that they have onely the *Sense* of *Feeling*; which is manifestly untrue: For if they goe forth-right to a Place, they must needs have Sight:

Sight: Besides they delight more in one *Flower*, or *Herb*, than in another, and therefore have *Taste*: And *Bees* are called with *Sound* upon *Brasse*, and therefore they have *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations *concerning the* Insecta, *together with the* Enumeration *of them, wee referre to that place, where we meane to handle the* Title *of* Animal's *in generall*.

Experiment Solitary, touching *Leaping*.

699

A *Man Leapeth* better with *Weights*, in his *Hands*, than without. The *Cause* is, for that the *Weight*, (if it be proportionable,) strengtheneth the *Sinnewes*, by *Contracting* them. For otherwise, where no *Contraction* is needfull, *Weight* hindreth. As wee see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, upon the one *Horse*, more than upon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* goe backward before they take their Raise. *Quære*, if the contrarie *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were, to breake forth with more Force: As *Breath* also drawne, and kept in, commeth forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater Swing, are first cast backward.

Experiment Solitary, touching the *Pleasures*, and *Displeasures* of the *Senses*, especially of *Hearing*.

700

OF *Musicall Tones*, and *Vnequall Sounds*, wee have spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skriching Noise*; make a *Shivering* or *Horrour* in the *Body*, and set the *Teeth* on edge. The *Cause* is, for that the *Objects* of the *Eare*, doe affect the *Spirits* (immediately) most with *Pleasure* and Offence. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There be *Sights*, that are *Horrible*, because they excite the *Memorie* of *Things* that are *Odious*, or *Fearefull*; But the same *Things Painted* doe little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharp, or Flat, if they be Sweet, have a Roundnesse and *Equalitie*; And if they be Harsh, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Divers Sounds Meeting*. It is true, that *Inequalitie*, not Stayed upon, but Passing, is rather an Encrease of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucitie* of a *Trumpet*; And in the *Nightinghale-Pipe* of a *Regall*; And in a *Discord* straight falling upon a *Concord*: But if you stay upon it, it is *Offensive*; And therefore, there be these three *Degrees* of *Pleasing*,

and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by divers Names, as *Skriching*, or *Grating*, such as we now speake of. As for the *Setting* of the *Teeth* on *Edge*, we see plainly, what an Intercourse there is, betweene the *Teeth*, and and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, betweene the *Teeth*, and *Striking* upon the *String*.

NATU-

NATVRALL HISTORIE.

VIII. Century.

THere be *Mineralls*, and *Fossiles*, in great Varietie; But of *Veines* of *Earth Medicinall*, but few; The Chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Armenus*: Whereof *Terra Lemnia* is the Chiefe. The *Vertues* of them are, for *Curing* of *wounds*, *Stanching* of *Bloud*, *Stopping* of *Fluxes* and *Rheumes*, and *Arresting* the *Spreading* of *Poison*, *Infection*, and *Putrefaction*: And they have, of all other *Simples*, the Perfectest and Purest *Qualitie* of *Drying*, with little or no Mixture of any other *Qualitie*. Yet it is true, that the *Bole-Arminick* is the most *Cold* of them; And that *Terra Lemnia* is the most *Hot*; For which Cause, the *Island Lemnos*, where it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

Experiment Solitary touching *Veines* of *Medicinall Earth*. 701

ABout the *Bottome* of the *Straights* are gathered great Quantities of *Sponges*, which are gathered from the sides of *Rocks*, being as it were a large, but tough, *Mosse*. It is the more to be noted, because that there be but few *Substances*, *Plant-like*, that grow deepe within the *Sea*; For they are gathered sometimes fifteen Fathome deepe; And when they are laid

Experiment Solitary touching the *Growth* of *Sponges*. 702

on Shoare, they seeme to be of great Bulke; But crushed together, will be transported in a verie small Roome.

Experiment Solitary touching *Sea-Fish* put in *Fresh Waters*. 703

IT seemeth, that *Fish*, that are used to the *Salt-Water*, doe nevertheless delight more in *Fresh*. We see, that *Salmons*, and *Smelts*, love to get into *Rivers*, though it be against the *Streame*. At the *Haven* of *Constantinople*, you shall have great *Quantities* of *Fish* that come from the *Euxine-Sea*; that when they come into the *Fresh Water*, doe inebriate and turne up their *Bellies*; So as you may take them with your Hand. I doubt, there hath not beene sufficient *Experiment* made of Putting *Sea-Fish* into *Fresh Water*, *Ponds*, and *Pooles*. It is a Thing of great Use, and Pleasure: For so you may have them new at some good distance from the *Sea*: And besides, it may be, the *Fish* will eat the pleasanter, and may fall to breed: And it is said that *Colchester Oysters*, which are put into Pits, where the *Sea* g eth and commeth, (but yet so, that there is a *Fresh Water* comming also to them, when the *Sea* voideth,) become by that meanes Fatter, and more Growne.

Experiment Solitary, touching *Attraction* by *Similitude* of *Substance*. 704

THe *Turkish-Bow* giveth a verie Forcible *Shoot*; Insomuch as it hath been knowne, that the *Arrow* hath pierced a *Steele Target*, or a Peece of *Brasse* of two Inches thicke: But that which is more strange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a Peece of *Wood*, of eight Inches thicke. And it is certaine, that we had in use at one time, for *Sea-Fight*, short *Arrowes*, which they called *Sprights*, without any other Heads, save *Wood* sharpned; which were discharged out of *Muskets*, and would pierce thorow the Sides of *Ships*, where a *Bullet* would not pierce. But this dependeth upon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude* of *Substance* will cause *Attraction*, where the Body is wholly freed from the *Motion* of *Gravitie*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the help of the *Lead-Stone*. But this same *Motion* of *Weight* or *Gravitie*, (which is a meere *Motion* of the *Matter*, and hath no Affinitie with the *Forme*, or *Kinde*,) doth kill the other *Motion*, except it selfe be killed by a violent *Motion*; As in these *Instances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Substance*, beginneth to shew it selfe. But we shall handle this Point of *Nature* fully in due Place.

Experiment Solitary touching certaine *Drinkes* in *Turkey*. 705

THey have in *Turkey*, and the *East*, certaine *Confections*, which they call *Serverts*, which are like to *Candied Conserves*; And are made of *Sugar* and *Limons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some other Flowers; And some Mixture of *Amber* for the more delicate Persons; And those they dissolve in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by their *Law*. But I doe much marvell, that no *Englishman*, or *Dutchman*, or *German* doth set up *Brewing* in *Constantinople*; Considering they have such Quantitie of *Barley*. For as for the

the generall Sort of *Men*, Frugalitie may be the *Cause* of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Cost. And yet I wonder the lesse at it, because I see *France*, *Italy*, or *Spaine*, have not taken into use, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that should begin it in *Turkey*.

Experiments in Consort touching *Sweat*. 706

IN *Bathing* in *Hot Water*, *Sweat* (nevertheless) commeth not in the *Parts* under the *Water*. The *Cause* is; First, for that *Sweat* is a Kinde of *Colliquation*. And that Kinde of *Colliquation* is not made, either by an *Over-Drie Heat*, or an *Over-Moist Heat*. For *Over-Moisture* doth somewhat extinguish the *Heat*; As wee see that even *Hot Water* quencheth *Fire*: And *Over-Drie Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* covered before the *Sunne*, or *Fire*, than if they stood Naked; And *Earthen Bottles*, filled with *Hot water*, doe provoke, in Bed, a *Sweat* more daintily, than *Bricke-bats Hot*. Secondly, *Hot Water* doth cause *Evaporation* from the *Skin*; So as it spendeth the Matter, in those Parts under the *Water*, before it issueth in *Sweat*. Againe, *Sweat* commeth more plentifully, if the *Heat* be increased by *Degrees*, than if it be greatest at first, or equall. The *Cause* is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physitians* may doe well, when they provoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorificke Herbs* in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the *lesse Heated* first, and after halfe an Houre the *more Heated*.

707 *Sweat* is *Salt* in Taste; The *Cause* is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud*, and *Flesh*; And the *Sweat* is only that *Part* which is *Separate*, and *Excerned*. *Bloud* also Raw hath some *Saltnesse*, more than Flesh; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Bloud*.

708 *Sweat* commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The *Reason* is, because those *Parts* are more repleni shed with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Dry*; As the *Forehead*, and *Breast*.

709 Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleepe* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Looseneſſe* of the *Body*, &c. The *Cause* is, for that in *Sleepe*, the *Heat* and *Spirits* doe naturally move inwards, and there rest. But when they are collected once within, the *Heat* becommeth more Violent, and Irritate; And thereby expelleth *Sweat*.

710 *Cold Sweats* are (many times) *Mortall*, and neere *Death*; And alwayes *ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The *Cause* is, for that *Cold Sweats* come by a *Relaxation* or *Forsaking* of the *Spirits*,

Spirits, whereby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, severeth, and issueth out.

711 In those *Diseases*, which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the Latter Sort is partly *Critical*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body*.

Experiment Solitary, touching the *Glo-worme*.

712 THe *Nature* of the *Glo-worme* is hitherto not well observed. Thus much wee see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Whereby it may be conceived, that the *Spirit* of them is verie fine, and not to be refined, but by *Summer Heats*: And againe, that by reason of the Fineneſſe, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Fly* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme*. But that *Fly* is chiefly upon *Fens*, and *Marrishes*. But yet the two former *Observations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greenne* of the *Fens*, give as good Shade, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so farre as to be *Winged*.

Experiments in Consort touching the *Impressions*, which the *Passions* of the *Minde* make upon the *Body*.

713 THe *Passions* of the *Minde*, worke upon the *Body* the *Impressions* following. *Feare* causeth *Paleneſſe*; *Trembling*; The *Standing* of the *Haire upright*; *Starting*; and *Skritching*. The *Paleneſſe* is caused, for that the *Blood* runneth inward, to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing Upright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth a-sloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing* feared; (And, in that kinde, it is a *Motion* of *Shrincking*;) And likewise an *Inquisition*, in the beginning, what the Matter should be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would listen suddenly to any Thing, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skritching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions*, though they be unprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* upon *Paine*.

714 *Griefe* and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; *Distorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the *Drawing* in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty. *Sobbing*

Sobbing is the same Thing stronger. *Groaning*, and *Screaming*, and *Roaring*, are caused by an *Appetite* of *Expulsion*, as hath beene said: For when the *Spirits* cannot expell the Thing that hurteth, in their Strife to do it, by *Motion* of *Consent*, they expell the *Voice*. And this is, when the *Spirits* will not groane. *Teares* are caused by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by consequence astringeth the *Moisture* of the *Braine*, and thereby sendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*; For *Wringing* is a *Gesture* of *Expression* of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first to beare and resist, and then to expell; Which maketh the Parts knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Sweating* is also a *Compound Motion* by the *Labour* of the *Spirits*, first to resist, and then to expell.

715 *Joy* causeth a *Chearefulnesse*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Teares*. All these are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Lively*, and *Stirring*. We know it hath beene seene, that *Excessive Sudden Joy* hath causeth *Present Death*, while the *Spirits* did spread so much, as they could not retire againe. As for *Teares*, they are the Effects of *Compression* of the *Moisture* of the *Braine*, upon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Braine*, by *Consent*, as hath beene said in *Griefe*. But then in *Joy*, it worketh it diversly; *viz.* by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupie more Roome.

716 *Anger* causeth *Paleneſſe* in some, and the *Going* and *Comming of the Colour* in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Paleneſſe*, and *Going* and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselves call in more *Spirits* from the *Outward Parts*. And if the *Paleneſſe* be alone, without *Sending forth* the *Colour* againe, it is commonly joyned with some *Feare*; But in many there is no *Paleneſſe* at all, but contrariwise *Rednesse* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Revenge*. *Trembling* in *Anger* is likewise by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is joyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same *Cause*, being an *Ebullition*. *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Revenge*.

717 *Light Displeasure* or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same *Causes* that *Trembling*, and *Horrour* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a Slow and Definite

Definite *Trembling*; And is a *Gesture* of *Slight Refusall*: And we see also, that a *Dislike* causeth (often) that *Gesture* of the *Hand*, which wee use, when we refuse a Thing, or warne it away. The *Frowning*, and *Knitting* of the *Browes*, is a *Gathering*, or *Serring* of the *Spirits*, to resist in some Measure. And we see also, this *Knitting* of the *Browes* will follow upon earnest *Studying*, or *Cogitation* of any Thing, though it be without *Dislike*.

718 *Shame* causeth *Blushing*; And *Casting downe* of the *Eyes*. *Blushing* is the *Resort* of *Bloud* to the *Face*; Which in the *Passion* of *Shame* is the *Part* that laboureth most. And although the *Blushing* will be seene in the whole *Breast*, if it be Naked, yet that is but in Passage to the *Face*. As for the *Casting downe* of the *Eyes*, it proceedeth of the *Reverence* a Man beareth to other Men; Whereby, when he is ashamed, hee cannot endure to looke firmely upon Others: And we see that *Blushing*, and the *Casting downe* of the *Eyes* both, are more when wee come before Many; *Ore Pompeii quid mollius? Nunquàm non coram pluribus erubuit:* And likewise when we come before *Great*, or *Reverend Persons*.

719 *Pitie* causeth sometimes *Teares*; And a *Flexion* or *Cast* of the *Eye aside*. *Teares* come from the same *Cause* that they doe in *Griefe*: for *Pitie* is but *Griefe* in Anothers Behalfe. The *Cast* of the *Eye* is a *Gesture* of *Aversion*, or *Lothnesse* to behold the *Object* of *Pitie*.

720 *Wonder* causeth *Astonishment*, or an *Immoveable Posture* of the *Bodie*; *Casting* up of the *Eyes* to *Heaven*; And *Lifting* up of the *Hands*. For *Astonishment*, it is caused by the *Fixing* of the *Minde* upon one *Object* of *Cogitation*, whereby it doth not spatiate and transcurre, as it useth: For in *Wonder* the *Spirits* flie not, as in *Feare*; But onely settle, and are made lesse apt to move. As for the *Casting* up of the *Eyes*, and *Lifting* up of the *Hands*, it is a *Kinde* of *Appeale* to the *Deitie*; Which is the *Authour*, by *Power*, and *Providence*, of *Strange Wonders*.

721 *Laughing* causeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulsion* of the *Breath*, with the loud *Noise*, which maketh the *Interjection* of *Laughing*; *Shaking* of the *Breast*, and *Sides*; *Running* of the *Eyes* with *Water*, if it be Violent, and Continued. Wherein first it is to be understood, that *Laughing* is scarce (properly) a *Passion*, But hath his *Source* from the *Intellect*; For in *Laughing* there ever precedeth a *Conceit* of somewhat *Ridiculous*. And therefore it is Proper to *Man*. Secondly, that the *Cause* of *Laughing* is but a *Light Touch* of the *Spirits*, and not so deepe an *Impression* as in other *Passions*. And therefore, (that which hath no *Affinitie* with the *Passions* of the *Minde*,) it is moved, and that in great vehemencie, only by *Tickling* some *Parts* of the *Body*: And we see that *Men* even in a *Grieved State* of *Minde*, yet cannot sometimes forbeare *Laughing*. Thirdly, it is ever joyned with some *Degree* of *Delight*: And therefore *Exhilaration* hath some *Affinitie* with *Joy*, though it be a much *Lighter Motion*: *Ridet severa est verum Gaudium*. Fourthly, that the *Object* of it is *Deformitie*, *Absurditie*, *Shrewd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these

Generall

Generall Notes gives some *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulsion* of the *Breath* and *Voice*, and *Shaking* of the *Breast* and *Sides*, they proceed (all) from the *Dilatation* of the *Spirits*; Especially being Sudden. So likewise, the *Running* of the *Eyes* with *Water*, (as hath been formerly touched, where we spake of the *Teares* of *Joy* and *Griefe*,) is an *Effect* of *Dilatation* of the *Spirits*. And for *Voluptuousnesse*, it is a great *Part* of the *Matter*: For we see, that any *Shrewd Turne* that lighteth upon Another; Or any *Deformitie*, &c. moveth *Laughter* in the Instant: Which after a little time it doth not. So we cannot *Laugh* at any Thing after it is *Stale*, but whilest it is *New*: And even in *Tickling*, if you *Tickle* the *Sides*, and give warning; Or give a *Hard* or *Continued Touch*, it doth not move *Laughter* so much.

722 *Lust* causeth a *Flagrante* in the *Eyes*; and *Priapisme*. The *Cause* of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the Things desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (For that great Use may be made of the *Observation*,) that (evermore) the *Spirits*, in all *Passions*, resort most to the *Parts* that labour most, or are most affected. As in the last, which hath been mentioned, they resort to the *Eyes* and *Whereon Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Dislikes* to the *Head*.

Experiments in Consort touching Drunkennesse.

723 It hath beene observed by the *Ancients*, and is yet beleeved, that the *Sperme* of *Drunken Men* is *Vofruitfull*. The *Cause* is, for that it is *Overmoistened*, and wanteth *Spissitude*. And wee have a merrie Saying, that they that goe *Drunke* to *Bed*, get *Drunkards*.

724 *Drunken Men* are taken with a plaine *Defect*, or *Destitution* in *Voluntarie Motion*. They Reele; They tremble; They cannot stand, nor speak strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate Part of the Place, where they are; And so make them Weake to move. And therefore *Drunken Men* are apt to fall asleepe: And *Opiates*, and *Stupefactives*, (as *Poppy*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkennesse*, by the *Grossenesse* of their *Vapour*; As *Wine* doth by the *Quantitie* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey upon it, as well as they: And so they make the *Spirits* lesse Supple, and Apt to move.

725 *Drunken Men* imagine every *Thing turneth round*; They imagine also that *Things come upon them*; They *See* not well *Things a farre off*: Those Things that they *See neare hand*, they *See out of their Place*: And (sometimes) they *see Things double*. The *Cause* of the Imagination that *Things turne Round*, is, for that the *Spirits* themselves turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* upon *Compression*, turneth, as we see in *Water*.) And it is all one to the *Sight*, whether the *Visuall Spirits* move, or the *Object* moveth, or the *Medium* moveth. And wee see that long *Turning Round* breedeth the same Imagination.

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The *Cause* of the Imagination that *Things come upon them*, is, for that the *Spirits Visuall* themselves draw backe; which maketh the *Object* seeme to come on: And besides, when they see Things turne Round, and Move, *Feare* maketh them thinke, they come upon them. The *Cause* that they cannot see *Things afarre off*, is the *Weaknesse* of the *Spirits*; for in every *Megrim*, or *Vertigo*, there is an *Obsenebration* joyned with a Semblance of *Turning round*. Which we see also in the lighter Sort of *Swounings*. The *Cause* of *seeing things out of their Place*, is the *Refraction* of the *Spirits Visuall*: For the *Humour* is as an *Vnequall Medium*: And it is, as the Sight of Things, out of place, in *Water*. The *Cause* of *seeing Things double*, is the *swift* and *Vnquiet Motion* of the *Spirits*, (being Oppressed,) to and fro; For, (as was said before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Object*, make the same *Appearances*. And for the *Swift Motion* of the *Object*, wee see, that if you fillip a *Lute-String*, it sheweth double, or Treble.

Men are sooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebriateth lesse, than *Wine Pure*. The *Cause* of the former is, for that the *Wine* descendeth not so fast to the *Bottome* of the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and sendeth *Vapours* sooner to the *Head*. And therefore inebriateth sooner. And, for the same Reason, *Sops* in *Wine*, (Quantitie for Quantitie,) inebriate more, than *Wine* of it selfe. The *Cause* of the Latter is, for that the *Sugar* doth infisiate the *Spirits* of the *Wine*; and maketh them not so easie to resolve into *Vapour*. Nay further, it is thought, to be some Remedy against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken upon much *Drinking*.

727 Experiment Solitary, touching the *Help* or *Hurt* of *Wine*, though *Moderately used*.

THe *Vse* of *Wine*, in *Dry*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Full Bodies*, it is good. The *Cause* is, for that the *Spirits* of the *Wine* doe prey upon the *Raw*, or *Radicall Moisture*, (as they terme it,) of the *Body*, and so deceive the *Animall Spirits*. But where there is *Moisture* Enough, or Superfluous, there *Wine* helpeth to digest, and deficcate the *Moisture*.

728 Experiment Solitary, touching *Caterpillers*.

THe *Caterpiller* is one of the most Generall of *Wormes*, and breedeth of *Dew*, and *Leaves*: For wee see infinite Number of *Caterpillers*, which breed upon *Trees*, and *Hedges*, By which the *Leaves* of the *Trees*, or *Hedges*, are in great Part consumed. As well by their Breeding out of the *Leafe*, as by their Feeding upon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East winds* have much blowne. The *Cause* whereof is, the *Drinesse* of that *Wind*: For to all *Vivification* upon *Putrefaction*, it is requisite the *Matter* be not too *Moist*. And therefore we see, they have *Cawebs* about them, which is a signe of a *Slimy Drinesse*: As we see upon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all over.

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We see also the *Greene Catterpiller* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Catterpillers*, both the greatest, and the most, bred upon *Cabbages*, which have a *Fat Leafe*, and apt to *Putrifie*. The *Catterpiller* towards the *End* of *Summer* waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps, some other *Fly*. There is a *Catterpiller*, that hath a *Furre*, or *Downe* upon him, and seemeth to have Affinitie with the *Silke-worme*.

Experiment Solitary, touching the *Flyes Cantharides*. 729

THe *Flyes Cantharides* are bred of a *Worme*, or *Catterpiller*, but peculiar to certaine *Fruit-Trees*; As are the *Fig tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosive*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersive*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no marvell though *Cantharides* have such a *Corrosive*, and *Cauterizing Quality*; For there is not any other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be, that the delicate-coloured *Dragon-Flies*, may have likewise some *Corrosive Qualitie*.

Experiments in Consort, touching *Lassitude*. 730

Lassitude is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warme water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* give a *Relaxation*, or *Emollition*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The *Reason* whereof is, partly, because by Chearing or Comforting of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischargeth *Wearinesse*; as *Sleepe* likewise doth.

731

In *Going up a Hill*, the *Knees* will be most *Weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *Lift* of the *Feet*, when a Man *Goeth up the Hill*, the Weight of the *Body* beareth most upon the *Knees*; And in *Going downe the Hill*, upon the *Thighes*.

Experiment Solitary, touching the *Casting* of the *Skin*, and *Shell*, in some *Creatures*. 732

THe *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make every *Casting* of the *Skin* a New *Birth*: And besides, the *Secundine* is but a generall *Cover*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grashopper*, the *Lizard* the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crafish*, the *Hodmandod* or *Dodman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* never: So as it is like, they scale off, and crumble away by degrees. And they are knowne, by the Extreame *Tenderne sse* and *Softnesse* of

of the *New Shell*; And somewhat by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantitie* of *Matter* in those *Creatures*, that is fit to make *Skin*, or *Shell*; And againe, the *Looseneſſe* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds*, that have much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments in Consort, touching the *Postures* of the *Body*. 733

Lying, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legs gathered up*, which is in the Posture of the Body, is the more Wholesome. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse Pensile: And we see, that in Weake *Stomachs*, the Laying up of the Legs high, and the Knees almost to the Mouth, helpeth, and comforteth. We see also that *Gally-slaves*, notwithstanding their Miserie otherwise, are commonly Fat and Fleshy; And the Reason is, because the *Stomach* is supported somewhat in *Sitting*; And is Pensile in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbs* move more than the *Stomach*, and Belly; As in *Rowing*, and in *Sawing* being *Set*.

734

Megrims and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the Sudden *Motion*, fly more up into the *Head*.

735

Leaning long upon any *Part* maketh it *Numme*, and, as wee call it, Asleepe. The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to have free Accesse; And therefore, when wee come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Expetiment Solitary, touching *Pestilentiall Yeares*. 736

It hath been noted, that those *Yeares* are *Pestilentiall*, and *Vnwholesome*, when there are great Numbers of *Frogs*, *Flyes*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you finde *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment Solitary, touching the *Prognosticks* of *Hard Winters*. 737

It is an Observation amongst *Country-People*, that *Yeares* of *Store* of *Hawes* & *Heps*, do commonly portend *Cold Winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth even to the *Falling of a Sparrow*; And much more is like to reach to the *Preservation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leave great *Quantitie* of *Cold Vapours*,

pours, not dissipate; Which causeth the *Cold* of the *Winter* following.

Experiment Solitary, touching *Medicines* that *Condense*, and *Relieve* the *Spirits*. 738

They have in *Turkey*, a *Drinke* called *Coffa*, made of a *Berrie* of the same Name, as Blacke as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tavernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Digestion*. Certainly this *Berrie Coffa*; The *Root*, and *Leafe Betel*; The *Leafe Tobacco*; And the *Teare* of *Poppy*, (*Opium*,) of which the *Turks* are great Takers, (supposing it expelleth all Feare;) doe all Condense the *Spirits*, and make them Strong, and Aleger. But it seemeth they are taken after severall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betel* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quære* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, Root, and Flower; Of *Folium Indum*; Of *Amber-grice*; Of the *Assyrian Amomum*, if it may be had; And of the *Scarlet Powder*, which they call *Kermez*; And (generally) of all such Things, as doe inebriate, and provoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible ever than *Leaves*.

Experiment Solitary, touching *Painting* of the *Body*. 739

The *Turkes* have a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long Pencill they lay under their *Eye-lids*; Which doth colour them Blacke; Whereby the *White* of the *Eye* is set off more *white*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* used to paint their *Eyes*. The *Turkes* use with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* Blacke: And divers with us, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* blacke, by Combing it, (as they say,) with a Leaden Combe, or the like. As for the *Chineses*, who are of an ill Complexion, (being Olivaster,) they paint their *Cheekes* Scarlet; Especially their *King*, & *Grandes*. Generally, *Barbarous People*, that goe Naked, doe not onely paint Themselves, but they pownce and raze their Skinne, that the *Painting* may not be taken forth; And make it into Works. So doe the *West Indians*; And so did the Ancient *Picts*, and *Brittons*; So that it seemeth, *Men* would have the *Colours* of *Birds Feathers*, if they could tell how; Or at least, they will have *Gay Skins*, in stead of *Gay Cloathes*.

Experiment Solitary touching the *use* of *Bathing* and *Anointing*. 740

It is strange, that the *use* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and *Grecians*, it was as usuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with us it remaineth but as a *Part* of *Physicke*. I am of Opinion, that the Use of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and easie to Waste. For the *Turkes* it is more proper, because that their *Drinking*

king *Water*, and *Feeding* upon *Rize*, and other Food of ſmall Nouriſhment, maketh their *Bodies* ſo Solide, and Hard, as you need not feare that *Bathing* ſhould make them *Froathy*. Beſides, the *Turkes* are great *Sitters*, and ſeldome walke; Whereby they Sweat leſſe, and need *Bathing* more. But yet certaine it is, that *Bathing*, and eſpecially *Annointing*, may be ſo uſed, as it may be a great Help to *Health*, and *Prolongation* of *Life*. But hereof we ſhall ſpeake in due Place, when we come to handle *Experiments Medicinall*.

Experiment Solitary, touching *Chamoletting* of *Paper*. 741

THe *Turkes* have a Prettie Art of *Chamoletting* of *Paper*, which is not with us in uſe. They take divers *Oyled Colours*, and put them ſeverally (in drops) upon *Water*; And ſtirre the *Water* lightly; And then wet their *Paper*, (being of ſome Thickneſſe,) with it; And the *Paper* will be Waved, and Veined, like *Chamolet*, or *Marble*.

Experiment Solitary, touching *Cuttle-Inke*. 742

IT is ſomewhat ſtrange, that the *Blond* of all *Birds*, and *Beaſts*, and *Fiſhes*, ſhould be of a *Red Colour*, and onely the *Blond* of the *Cuttle* ſhould be as *Blacke* as *Inke*. A Man would thinke, that the *Cauſe* ſhould be the *High Concoction* of that *Blond*; For we ſee in ordinarie *Puddings*, that the *Boyling* turneth the *Blond* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Requeſt.

Experiment Solitary, touching Increaſe of weight in Earth. 743

IT is reported of Credit, that if you take *Earth*, from Land adjoyning to the *River* of *Nile*, And preſerve it in that manner, that it neither come to be Wet, nor Waſted; And Weigh it daily, it will not alter *Weight* untill the ſeventeenth of *June*, which is the Day when the *River* beginneth to riſe; And then it will grow more and more *Ponderous*, till the *River* commeth to his Heighth. Which if it be true, it cannot be cauſed, but by the *Aire*, which then beginneth to Condenſe; And ſo turneth within that Small *Mould* into a degree of *Moiſture*; Which produceth *Weight*. So it hath beene obſerved, that *Tobacco*, Cut, and Wighed, and then Dried by the Fire, loſeth Weight; And after being laid in the open *Aire*, recovereth *Weight* againe. And it ſhould ſeeme, that as ſoone as ever the *River* beginneth to increaſe, the whole *Body* of the *Aire* thereabouts ſuffereth a Change: For (that which is more ſtrange,) it is credibly affirmed, that upon that verie Day, when the *River* firſt riſeth, great *Plagues*, in *Cairo*, uſe ſuddenly to breake up.

Experiments in Conſort touching *Sleepe*. 744

THoſe that are verie *Cold*, and eſpecially in their *Feet*, cannot get to *Sleepe*. The *Cauſe* may be, for that in *Sleepe* is required a *Free Reſpiration*, which *Cold* doth ſhut in, and hinder: For wee ſee, that in great *Colds*, one can ſcarce draw his *Breath*. Another *Cauſe* may be, for that *Cold* calleth the *Spirits* to ſuccour; And therefore they cannot ſo well cloſe, and goe together in the *Head*; Which is ever requiſite to *Sleepe*. And for the ſame *Cauſe*, *Paine*, and *Noiſe* hinder *Sleepe*; And *Darkneſſe* (contrariwiſe) furthereth *Sleepe*.

Some

Some *Noiſes* (whereof wee ſpake in the 112. *Experiment*) helpe *Sleepe*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The *Cauſe* is, for that they move in the *Spirits* a gentle *Attention*; And whatſoever moveth *Attention*, without too much Labour, ſtilleth the Naturall and diſcurſive *Motion* of the *Spirits*. 745

Sleepe nouriſheth, or at leaſt preſerveth *Bodies*, a long time, without other *Nouriſhment*. *Beaſts* that ſleepe in *Winter*, (as it is noted of *wilde Beares*,) during their *Sleepe* wax verie Fat, though they Eat nothing. *Bats* have beene found in Ovens, and other Hollow Cloſe Places, Matted one upon another; And therefore it is likely that they *Sleepe* in the *Winter time*, and eat Nothing. *Quære*, whether *Bees* doe not *Sleepe* all Winter, and ſpare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleepe*, but lye as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, revive againe. A *Dormouſe*, both *Winter* and *Summer*, will *Sleepe* ſome dayes together, and eat *Nothing*. 746

Experiments in Conſort touching *Teeth* and *Hard Subſtances* in the *Bodies of Living Creatures*. 747

To reſtore *Teeth* in *Age*, were *Magnale Naturæ*. It may be thought of. But howſoever the *Nature* of the *Teeth* deſerveth to be enquired of, as well as the other *Parts* of *Living Creatures Bodies*.

THere be Five *Parts* in the *Bodies* of *Living Creatures*, that are of *Hard Subſtance*; The *Skull*; The *Teeth*; The *Bones*; The *Hornes*; & the *Nailes*. The greateſt *Quantitie* of *Hard Subſtance* Continued, is towards the *Head*. For there is the *Skull* of one Entire *Bone*; There are the *Teeth*; There are the *Maxillarie Bones*; There is the *Hard Bone*, that is the *Inſtrument* of *Hearing*; And thence iſſue the *Hornes*: So that the *Building* of *Living Creatures Bodies*, is like the *Building* of a *Timber-Houſe*, where the *Walls*, and other *Parts* have *Columnes*, and *Beames*; But the *Roofe* is, in the better Sort of *Houſes*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they have Three other *Hard Subſtances* proper to them; The *Bill*, which is of like Matter with the *Teeth*; For no *Birds* have *Teeth*: The *Shell* of the *Egge*: And their *Quills*: For as for their *Spurre*, it is but a *Naile*. But no *Living-Creatures*, that have *Shells* verie hard; (As *Oyſters*, *Cockles*, *Muſſles*, *Scallops*, *Crabs*, *Lobſters*, *Cra-fiſh*, *Shrimps*, and eſpecially the *Tortoiſe*,) have *Bones* within them, but onely little *Griſtles*.

Bones, after full Growth, continue at a Stay: And ſo doth the *Skull*: *Hornes*, in ſome *Creatures*, are caſt, and renued: *Teeth* ſtand at a Stay except their Wearing: As for *Nailes*, they grow continually: And *Bills* and *Beakes* will over-grow, and ſometimes be caſt; as in *Eagles*, and *Parrots*. 748

Moſt of the *Hard Subſtances* fly to the *Extremes* of the *Body*; As *Skull*, *Hornes*, *Teeth*, *Nailes*, and *Beakes*: Onely the *Bones* are more *Inward*, and clad with *Fleſh*. As for the *Entrailes*, they are all without *Bones*; Save that a *Bone* is (ſometimes) found in the *Heart* of a *Stag*; And it may be in ſome other *Creature*. 749

750 The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Back-Bone* hath one Kinde of *Marrow*, which hath an Affinitie with the *Braine*; And other *Bones* of the *Body* have another. The *Iaw-Bones* have no *Marrow* Severed; but a little *Pulp* of *Marrow* diffused. *Teeth* likewise are thought to have a kinde of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more than *Bloud*. *Horne* is alike throughout; And so is the *Naile*.

751 None other of the *Hard Substances* have *Sense*, but the *Teeth*: And the *Teeth* have *Sense*, not onely of *Paine*, but of *Cold*.

But we will leave the Enquiries *of other* Hard Substances, *unto their severall Places; And now enquire onely of the* Teeth.

752 The *Teeth* are, in *Men*, of three Kindes: *Sharp*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed-Teeth*, or *Canine*, which are betweene both. But there have been some *Men*, that have had their *Teeth undivided*, as of one whole *Bone*, with some little Marke in the Place of the Division; As *Pyrrhus* had. Some *Creatures* have *Over-long*, or *Out-growing Teeth*, which wee call *Pangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs* though lesse. Some *Living Creatures* have *Teeth* against *Teeth*; As *Men*, and *Horses*; And some have *Teeth*, especially their *Master-Teeth*, indented one within another, like *Saives*; As *Lions*; And so againe have *Dogs*. Some *Fishes* have divers *Rowes* of *Teeth* in the *Roofe* of their *Mouths*; As *Pikes*, *Salmons*, *Trouts*, &c. And many more in *Salt Waters*. *Snakes*, and other *Serpents*, have *Venemous Teeth*; which are sometimes mistaken for their *Sting*.

753 No *Beast* that hath *Hornes*; hath *Upper Teeth*; And no *Beast*, that hath *Teeth* above, ingnoreth them below: But yet if they be of the same *Kinde*, it followeth not, that if the *Hard Matter* goeth not into *Upper Teeth*, it will goe into *Hornes*; Nor yet *e converso*; For *Doe's*, that have no *Hornes*, have no *Upper Teeth*.

754 *Horses* have, at three yeares old, a *Tooth* put forth, which they call the *Colt-Tooth*. And at foure yeares old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; And that weareth shorter and shorter, every yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; *That the Marke is out of the Horse's Mouth*.

755 The *Teeth* of *Men* breed first, when the *Childe* is about a yeare and halfe old: And then they cast them, and new come about seven yeares old. But divers have *Backward-Teeth* come forth at Twentie, yea some at Thirtie, and Fortie. *Quære* of the manner of the *Comming* of them forth. They tell a Tale of the old *Countesse* of *Desmond*, who lived till shee was seven-score yeares old, that shee did *Dentire*, twice, or thrice; Casting her old *Teeth*, and others Comming in their Place.

756 *Teeth* are much hurt by *Sweet-Meats*; And by *Painting* with *Mercurie*; And by *Things Over-hot*; And by *Things Over-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

Concerning

757 Concerning *Teeth*, these Things are to be Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Staying* and *Easing* of the *Tooth-ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* have beene strucken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The *Instances* that give any likelihood of *Restoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are Commateriall with *Teeth*. *Quære* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to have beene provoked by *Art*; Therfore let *Triall* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they may be procured to come *Larger* than usuall; As to make an *Oxe*, or a *Deere*, have a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may be brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and provoked. It may be tried also, whether *Birds* may not have some thing done to them, when they are *Young*, wherby they may be made to have *Greater*, or *Longer Bills*; Or *Greater* and *Longer Tallons*? And whether *Children* may not have some *Wash*, or Some thing to make their *Teeth Better*, and *Stronger*? *Corall* is in use as an Help to the *Teeth* of *Children*.

Experiments in Consort, touching the *Generation* & *Bearing* of *Living Creatures* in the *Wombe*.

758 SOme *Living Creatures generate* but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheepe*, *Wilde Conneyes*, &c. And most Sorts of *Birds*, and *Fishes*: Others at *any time* of the *Yeare*, as *Men*; And all *Domestick Creatures*; As *Horses*, *Hogs*, *Dogs*, *Cats*, &c. The *Cause* of *Generation* at *all Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plentie* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all Seasons, are full of *Heat*, and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearefulnesse*, and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildnesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a dry *Substance* in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the Time of *Going* to *Rut* of *Deere* is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Earely about the Middle of *September*, they goe to Rut somewhat the sooner; If *Droughts*, somewhat the later. So *Sheepe*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at certaine

taine *Seasons*; generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat*, and *Comfort* of the *Spring* prepareth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of Generation: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest shee is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Egges*, or *Young Ones*, out of the *Nests* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759 Of *Living Creatures*, some are *Longer time* in the *Womb*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six Moneths; *Doe's* goe about nine Moneths; *Mares* eleven Moneths; *Bitches* nine Weekes; *Elephants* are said to goe two Yeares; For the Received *Tradition* of ten Yeares is *Fabulous*. For *Birds* there is double Enquirie; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe betweene the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds*, there is lesse *Diversitie* of *Time*, than amongst other *Creatures*; yet some there is: For the *Hen* sitteth but three Weekes; The *Turky-Hen*, *Goose*, and *Ducke*, a Moneth: *Quære* of others. The *Cause* of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Womb*. For the former, those that are longer in *Comming* to their *Maturitie* or *Growth*, are longer in the *Womb*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *Womb*, are long time in *Comming* to their full *Growth*. But in most other Kindes, the *Constitution* of the *Womb*, (that is, the *Hardnesse* or *Drinesse* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure yeares of *Growth*; And so the *Fawne*; And so the *Calfe*. But *Whelps*, which come to their *Growth* (commonly) within three Quarters of a yeare, are but nine Weekes in the *Womb*. As for *Birds*, as there is lesse Diversitie, amongst them, in the time of their *Bringing forth*; So there is lesse Diversitie in the time of their *Growth*; Most of them comming to their *Growth* within a Twelve-Moneth.

760 Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *Women*, *Lionesses*, &c. This may be caused, either by the *Quantitie* of *Sperme* required to the *Producing* One of that Kinde; which if lesse be required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *Womb*, which may sever the *Sperme*.

Experiments in Consort, touching *Species Visible*.

761 THere is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling*, in the *Bottome* of the *Water*, will shew greater; So will a *Candle* in a *Lanthorne*, in the *Bottome* of the *Water*. I have heard of a Practice, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* Diveth, having his *Eyes* open, and swimmeth upon his *Backe*;

Backe; whether (I say) he seeth *Things* in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh I know not.

It would be well boulted out, whether great *Refractions* may not be made upon *Reflexions*, as well as upon *Direct Beames*. For Example, We see that take an *Emptie Bason*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Bason*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Bason* with *Water*, and you shall see it out of his Place, because of the *Reflexion*. To proceed therefore, put a *Looking-Glasse* into a *Bason* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beautie*, and *Strangenesse*, were a fine Proofe: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cesterne* or *Poole* of *Water*, you shall place over against it a *Picture* of the *Devill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Devills Picture* aside, not seeing the *Water*, it will looke like a *Devill* indeed. They have an old tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeples*: Which was thought to be done by *Glasses*, when he walked upon the *Ground*.

762

A *Weightie Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, Partly because *Motion* doth discusse the *Torpour* of *Solide Bodies*; Which beside their *Motion* of *Gravitie*, have in them a *Naturall Appetite*, not to move at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* upon which it resteth, a stronger *Compression* of *Parts*, than it hath of it Selfe: And therefore needeth more Force to be put in *Motion*. For if a *Weightie Body* be Pensile, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* verie neare as easily, as if it were already in *Motion*.

Experiments in Consort touching *Impulsion*, and *Percussion*.

763

764 A *Body Over-great*, or *Over-small*, will not be throwne so farre, as a *Body* of a *Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *Proportion*, betweene the *Body Moved*, and the *Force*, to make it move well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moveth*, and the *Resistance* of the *Body* that is *Moved*: And if the *Body* be *too great*, it yeeldeth too little; And if it be *too small*, it resisteth too little.

765 It is *Common Experience*, that no *Weight* will presse or cut so strong, being laid upon a *Body*, as Falling, or strucken from above. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moved*, have by *Impulsion*, or by the *Motion* of *Gravitie continued*, a *Compression* in them, as well downwards, as they have when they are throwne, or Shot thorow the *Aire*, forwards.

forwards. I conceive alſo, that the quicke *Looſe* of that *Motion*, preventeth the *Reſiſtance* of the *Body* below; And *Prioritie* of the *Force*, (alwayes,) is of great *Efficacie*; As appeareth in infinite *Inſtances*.

Experiment Solitary, touching *Titillation*. 766

Tickling is moſt in the *Soles* of the *Feet*, and under the *Arme-Holes*, and on the *Sides*. The *Cauſe* is, the *Thinneſſe* of the *Skin* in thoſe *Parts*; Ioyned with the Rareneſſe of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinneſſe* of the *Skin*, and *Suddenneſſe*, and *Rareneſſe* of *Touch*, doe further: For we ſee, a *Feather*, or a *Ruſh*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuſe*, or a *Touch* more *Hard*, doth not. And for *Suddenneſſe*; We ſee no *Man* can tickle himſelfe: We ſee alſo, that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not Tickliſh, becauſe it is accuſtomed to be Touched. *Tickling* alſo cauſeth *Laughter*. The *Cauſe* may be, the *Emiſſion* of the *Spirits*, and ſo of the *Breath*, by a *Flight* from *Titillation*; For upon *Tickling*, wee ſee there is ever a *Starting*, or *Shrinking* away of the Part, to avoid it; And we ſee alſo, that if you Tickle the *Noſthrills*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emiſſion* of the *Spirits*, that doe likewiſe expell the *Moiſture*. And *Tickling* is ever Painfull, and not well endured.

Experiment Solitary, touching the *Scarcity of Raine in Ægypt*. 767

IT is ſtrange, that the *River* of *Nilus*, Over-flowing, as it doth, the *Countrey* of *Ægypt*, there ſhould be nevertheleſſe little or no *Raine* in that *Countrey*. The *Cauſe* muſt be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be aſcribed, either unto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not ſo much as *Standing Waters*; Or elſe to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not ſo much, as *Waters Raw*; No more than *waters* upon the Fire doe vapour ſo much, after ſome time of Boyling, as at the firſt. And it is true, that the *Water* of *Nilus* is ſweeter than other *Waters* in Taſte; And it is excellent Good for the *Stone*, and *Hypochondriacall Melancholy*; Which ſheweth it is *Lenefying*: And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without Shade, either of *woods*, or *Hills*; Whereby the *Sunne* muſt needs have great Power to *Concoct* it. As for the *Aire*, (from whence I conceive this Want of Showers commeth chiefly;) The *Cauſe* muſt be, for that the *Aire* is, of it ſelfe, *Thin* and *Thirſtie*; And as ſoone as ever it getteth any *Moiſture* from the *Water*, it imbibeth, and diſſipateth it, in the whole body of the *Aire*; And ſuffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment Solitary, touching *Clarification*. 768

IT hath beene touched in the *Title* of *Percolations*, (Namely ſuch as are *Inwards*,) that the *Whites* of *Eggs*, and *Milke*, doe clarifie; And it is certaine, that in *Ægypt*, they prepare and clarifie the *Water* of *Nile*, by putting it into great *Iarres* of *Stone*, and Stirring it about with a few Stamped

Stamped *Almonds*; Wherewith they alſo beſmeare the Mouth of the *Veſſell*; And ſo draw it off, after it hath reſted ſome time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Muſt*, to haſten, and perfect the *Clarifying*.

Experiment Solitary, touching *Plants* without *Leaves*. 769

THere be ſcarce to be found any *Vegetables*, that have *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is alſo in the *Deſarts* of *S. Macario* in *Ægypt*, a *Plant* which is Long, Leaveleſſe, Browne of Colour, and Branched like *Corall*, ſave that it cloſeth at the *Top*. This being ſet in *Water* within *Houſe*, ſpreadeth and diſplayeth ſtrangely; And the People thereabouts have a Superſtitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Eaſie Deliverance*.

Experiment Solitary, touching the *Materials* of *Glaſſe*. 770

THe *Cryſtalline Venice Glaſſe*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pavia*, by the *River Ticinum*; And the *Aſhes* of a *Weed* called by the *Arabs Kali*, which is gathered in a *Deſart* betweene *Alexandria* and *Roſetta*; And is by the *Ægyptians* uſed firſt for Fuell; And then they cruſh the *Aſhes* into Lumps, like a *Stone*; And ſo ſell them to the *Venetians* for their *Glaſſe-worke*.

Experiment Solitary, touching *Prohibition* of *Putrefaction*, and the *Long Conſervation* of *Bodies*. 771

IT is ſtrange, and well to be noted, how long *Carkaſſes* have continued *Vncorrupt*, and in their former *Dimenſions*; As appeareth in the *Mummies* of *Ægypt*; Having laſted, as is conceived, (ſome of them,) three thouſand yeares. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailes*, which are the *Parts* apteſt to corrupt. But that is nothing to the Wonder: For we ſee, what a Soft and Corruptible *Subſtance* the *Fleſh*, of all the other *Parts* of the *Body*, is. But it ſhould ſeeme, that according to our *Obſervation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which wee conceive to be ſo *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that Haſte to *Corruption*, that is conceived. And therefore *Bodies*, in *Shining-Amber*; In *Quicke-Silver*; In *Balmes*, (whereof wee now ſpeake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conſervatories* of *Snow*; &c. are preſerved verie long. It need not goe for Repetition, if we reſume againe that which wee ſaid in the aforeſaid *Experiment*, concerning *Annihilation*; Namely, that if you provide againſt three *Cauſes* of *Putrefaction*, *Bodies* will not corrupt: The Firſt is, that the *Aire* be *excluded*; For that undermineth the *Body*, and conſpireth with the *Spirit* of the *Body* to diſſolve it. The Second is, that the *Body Adjacent* and *Ambient* be not Commateriall, but meerely Heterogeneall towards the Body that is to be preſerved: For if nothing can be received by the One, Nothing can iſſue from the Other; Such are *Quick-Silver*, and *White-Amber*, to *Herbs*, & *Flies*, and ſuch *Bodies*. The Third is, that the *Body* to be preſerved, be not of that *Groſſe*, that it may corrupt within it ſelfe, although no Part of it iſſue into the *Body Adjacent*: And therefore it muſt be rather *Thin*, and *Small*, than of *Bulke*. There is a Fourth *Remedie* alſo, which is; That

That if the *Body* to be preſerved be of *Bulke*, as a *Corps* is, then the *Body* that incloſeth it, muſt have a Vertue to draw forth, and drie the *Moiſture* of the *Inward Body*; For elſe the *Putrefaction* will play within, though Nothing iſſue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of *King Numa*; It being ſome foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Diſcipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to be ſeene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as freſh, as if they had been but newly Written; being written in *Parchment*, and couered over with *Watch-Candles* of *Wax*, three or foure fold. By this it ſeemeth, that the *Romans*, in *Numa's* time, were not ſo good *Embalmers*, as the *Ægyptians* were; Which was the *Cauſe* that the Body was utterly conſumed. But I finde in *Plutarch*, and Others, that when *Auguſtus Cæſar* viſited the *Sepulchre* of *Alexander* the *Great*, in *Alexandria*, he found the *Body* to keepe his *Dimenſion*; But withall, that, notwithſtanding all the *Embalming*, (which no doubt was of the beſt,) the *Body* was ſo Tender, as *Cæſar* touching but the *Noſe* of it, defaced it. Which maketh mee finde it very ſtrange, that the *Ægyptian Mummies* ſhould be reported to be as Hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very Materiall; Namely, that the Ancient *Ægyptian Mummies*, were ſhrowded in a Number of Folds of *Linnen*, beſmeared with *Gums*, in manner of *Seare-Cloth*; Which it doth not appeare was practiſed upon the *Body* of *Alexander*.

Experiment Solitary, touching the *Abundance* of *Nitre* in certaine *Sea-Shoares*. 772

NEare the *Caſtle* of *Catie*, and by the *Wells* of *Aſſan*, in the *Land* of *Idumea*, a great Part of the Way, you would thinke the *Sea* were neare hand, though it be a good diſtance off: And it is Nothing, but the *Shining* of the *Nitre*, upon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

Expetiment Solitary, touching *Bodies* that are *borne up* by *Water*. 773

THe *Dead-Sea*, which vomiteth up *Bitumen*, is of that *Craſſitude*, as *Living Bodies* bound Hand and Foot, caſt into it, have beene borne up, and not ſunke. Which ſheweth, that all *Sinking* into *Water*, is but an *Over-weight* of the *Body*, put into the *Water*, in reſpect of the *Water*: So that you may make *Water* ſo ſtrong, and heauy, of *Quicke-Silver*, (perhaps,) or the like, as may beare up *Iron*: Of which I ſee no Uſe, but Impoſture. Wee ſee alſo, that all *Metalls*, except *Gold*, for the ſame reaſon, ſwimme upon *Quicke-Silver*.

Experiment Solitary, touching *Fuell*, that *conſumeth little*, or *nothing*. 774

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make Fires,) which burneth like a *Coale*, and diminiſheth not; But onely waxeth Brighter, and Whiter. That it ſhould doe ſo, is not ſtrange; For we ſee *Iron* Red Hot burneth, and conſumeth not: But the Strangeneſſe is, that it ſhould continue any time ſo: For *Iron*, as ſoone as it is out of the Fire, deadeth ſtraight-waies. Certainly, it were a Thing of great Uſe, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet laſt long: Neither am I altogether Incredulous, but there may be ſuch *Candles*, as they ſay are made of *Salamanders Wooll*; Being a Kinde of *Minerall*, which whiteneth alſo in the Burning, and conſumeth not. The Queſtion is this; *Flame* muſt be made of ſomewhat; And commonly it is made of ſome *Tangible Body*, which hath *weight*: But it is not impoſſible, perhaps, that it ſhould be made of *Spirit*, or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *Weight*;) ſuch as is the Matter of *Ignis Fatuus*. But then you will ſay, that that *Vapour* alſo can laſt but a ſhort time: To that it may be anſwered, That by the helpe of *Oile*, and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Wicke* not burne.

Experiment Solitary *Oeconomicall* touching *cheape Fuell*. 775

SEa-*Coale* laſt longer than *Char-Coale*; And *Char-coale* of *Roots*, being Scoaled into great Peeces, laſt longer than Ordinary *Char-Coale*. *Turfe*, and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and laſt long. *Small-Coale*, or *Briar-Coale*, powred upon *Char-Coale*, make them laſt longer. *Sedge* is a cheape *Fuell* to Brew, or Bake with; the rather becauſe it is good for Nothing elſe. Triall would be made of ſome Mixture of *Sea-Coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-Coale-Men* uſe it, privily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be uſed purpoſely, and be made knowne, it is Saving.

Experiment Solitary, touching the *Gathering* of *Wind* for *Freſhneſſe*. 776

IT is, at this Day, in uſe, in *Gaza*, to couch *Pot-Sheards* or *Veſſels* of *Earth*, in their *Walls*, to gather the *Wind* from the Top, and to paſſe it downe in Spouts into *Roomes*. It is a Device for *Freſhneſſe*, in great Heats: And it is ſaid, there are ſome *Roomes* in *Italie*, and *Spaine*, for *Freſhneſſe*, and *Gathering* the *Winds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *Winds*, and *Enlarging* them againe, and *Making* them *Reverberate*, and *goe Round* in *Circles*, rather than this *Device* of *Spouts* in the *Wall*.

Experiments Solitary, touching the *Trials* of *Aires*. 777

THere would be uſed much diligence, in the Choice of ſome *Bodies*, and *Places*, (as it were,) for the *Taſting* of *Aire*; to diſcover the *wholeſomeneſſe* or *Vnwholeſomeneſſe*, as well of *Seaſons*, as of the *Seats* of *Dwellings*. It is certaine, that there be ſome *Houſes*, wherein *Confitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perſwaded, that a *Peece* of *Raw Fleſh*, or *Fiſh*, will ſooner corrupt in ſome *Aires*, than in Others. They be noble *Experiments*, that can make this *Diſcoverie*. For they ſerve for a *Naturall Divination* of *Seaſons*; Better than the *Aſtronomers* can by their *Figures*: And againe, they teach *Men* where to chuſe their *Dwelling*, for their better *Health*.

Experiment Solitary, touching *Increa-*

THere is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *Water*, whereof *Cattell* drinke; Which maketh them give

sing of Milke in Milch Beasts. 778

give more *Milke*. Surely, there would be some better Trialls made of *Mixtures of Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten them*; Or to *Keepe* them from *Murraine*. It may be, *Chalke*, and *Nitre*, are of the best.

Experiment Solitary, touching *Sand* of the *Nature* of *Glasse*.
779

IT is reported, that in the *Valley*, neare the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which, of all other, hath most Affinitie with *Glasse*; Insomuch as other *Mineralls*, laid in it, turne to a *Glassie Substance*, without the *Fire*; And againe *Glasse* put into it, turneth into the *Mother-Sand*. The Thing is very strange, if it be true: And it is likeliest to be Caused by some *Naturall Furnace*, or *Heat* in the *Earth*; And yet they doe not speake of any *Eruption* of *Flames*. It were good to trie in *Glasse-Workes*, whether the *Crude Materialls* of *Glasse*, mingled with *Glasse*, already made and Re-moulten, doe not facilitate the *Making* of *Glasse* with lesse *Heat*.

Experiment Solitary, touching the *Growth of Corall*.
780

IN the *Sea*, upon the *South-west* of *Sicilie*, much *Corall* is found. It is a *Sub-Marine Plant*. It hath no *Leaves*: It brancheth onely when it is under *Water*; It is *Soft*, and *Greene* of *Colour*: But being brought into the *Aire*, it becommeth *Hard*, and *Shining* Red, as we see. It is said also, to have a *White Berry*; But we finde it not brought over with the *Corall*. Belike it is cast away as nothing worth: Inquire better of it, for the *Discoverie* of the *Nature* of the *Plant*.

Experiment Solitary, touching the *Gathering* of *Manna*.
781

THe *Manna* of *Calabria* is the best, and in most Plenty. They gather it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberry Trees*, as grow in the *Valley's*. And *Manna* falleth upon the *Leaves* by *Night*, as other *Deawes* doe. It should seeme, that before those *Deawes* come upon *Trees* in the *Valley's*, they dissipate, and cannot hold out. It should seeme also, the *Mulberry-Leafe*, it selfe, hath some Coagulating Vertue, which inspissateth the *Deaw*, for that it is not found upon other *Trees*: And we see by the *Silke-Worme*, which feedeth upon that *Leafe*, what a Dainty Smooth *Iuyce* it hath; And the *Leaves* also, (especially of the Blacke *Mulberry*,) are somewhat Bristly, which may helpe to preserve the *Deaw*. Certainly, it were not amisse, to observe a little better, the *Deawes* that fall upon *Trees*, or *Herbs*, Growing on *Mountaines*; For, it may be, many *Deawes* fall, that spend before they come to the *Valleys*. And I suppose, that he that would gather the best *May-Deaw* for *Medicine*, should gather it from the *Hills*.

Experiment Solitary, touching the *Correcting of Wine*.
782

IT is said, they have a manner, to prepare their *Greeke-Wines*, to keepe them from *Fuming*, and *Inebriating*, by adding some *Sulphur*, or *Allome*: Whereof the one is *Vnctuous*, and the other is *Astringent*. And certaine it is, that those two *Natures* doe best represse *Fumes*. This *Experiment* would be transferred, unto other *Wine*, and *Strong Beere*, by Putting in some like *Substances*, while they worke; Which may make them both to *Fume* lesse, and to *Inflame* lesse.

It

Experiment Solitary, touching the *Materialls* of *Wild-Fire*.
783

IT is conceived by some, (not improbably,) that the reason, why *Wilde-Fires*, (Whereof the principall Ingredient is *Bitumen*,) doe not quench with *Water*, is, for that the first *Concretion* of *Bitumen* is a *Mixture*, of a *Fiery*, and *Watry Substance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court* of *Vulcan*, you shall heare, under the *Earth*, a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Ætna*, and *Vesuvius*, and the like, which consist upon *Sulphur*, shoot forth *Smoake*, and *Ashes*, and *Pumice*, but no *Water*. It is reported also, that *Bitumen* Mingled with *Lime*, and Put under *Water*, will make, as it were, an *Artificiall Rocke*; The *Substance* becommeth so Hard.

Experiment Solitary, touching *Plaster* growing as Hard as *Marble*.
784

THere is a *Cement*, compounded of *Flower*, *Whites* of *Egges*, and *Stone powdred*, that becommeth Hard as *Marble*; wherewith *Piscina mirabilis*, neare *Cuma*, is said to have the *Walls* Plastered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *Whites* of *Egges*, and *Gumm-Dragon*, made into *Paste*, will in a few dayes harden to the Hardnesse of a *Stone*.

Experiment Solitary, touching *Iudgement* of the *Cure* in some *Vlcers* and *Hurts*.
785

IT hath beene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Vlcers* or Hurts in the *Leggs*, are Hard to Cure; And in the *Head* more Easie. The *Cause* is, for that *Vlcers* or *Hurts* in the *Leggs* require *Desiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwise *Drinesse* maketh them more apt to Consolidate. And in Moderne Observation, the like difference hath beene found, betweene *French-Men*, and *English-men*; Whereof the ones *Constitution* is more *Dry*, and the others more *Moist*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *English-Man*.

Experiment Solitary, touching the *Healthfulnesse* or *Vnhealthfulnesse* of the *Southerne Wind*.
786

IT hath beene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cause a *Feverous Disposition* of the *Yeare*; But with *Raine*, not. The *Cause* is, for that *Southerne Winds* doe, of themselves, qualifie the *Aire*, to be apt to cause *Fevers*; But when *Showers* are joyned, they doe Refrigerate in Part, and Checke the Sultry *Heat* of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coasts*, because the *Vapour* of the *Sea*, without *Showers*, doth refresh.

Experiment Solitary, touching *Wounds*.
787

IT hath beene noted by the *Ancients*, that *Wounds* which are made with *Brasse*, heale more easily, than *Wounds* made with *Iron*. The *Cause* is, for that *Brasse* hath, in it selfe, a *Sanative Vertue*; And so in the very Instant helpeth somewhat: But *Iron* is *Corrosive*, and not *Sanative*. And therefore it were good, that the Instruments which are used by *Chirurgians* about *Wounds*, were rather of *Brasse*, than *Iron*.

In

Experiment Solitary, touching *Mortification* by *Cold*. 788

IN the *Cold Countries*, when Mens *Noses*, and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a Fire, they rot off presently. The *Cause* is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Putrefaction* is made Compleat. But *Snow* Put upon them, helpeth; For that it preserveth those *Spirits* that remaine, till they can revive; And besides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proved out of the *Text*; *Qui dat Nivem sicut Lanam, Gelu sicut Cinerem spargit.* Whereby he did inferre, that *Snow* did warme like *Wooll*, and *Frost* did fret like *Ashes*. *Warme Water* also doth good; Because by little and little it openeth the Pores, without any sudden Working upon the *Spirits*. This *Experiment* may be transferred unto the *Cure* of *Gangrenes*, either Comming of themselves, or induced by too much Applying of *Opiates*: Wherein you must beware of *Dry Heat*, and resort to Things that are *Refrigerant*, with an Inward *Warmth*, and *Vertue* of Cherishing.

Experiment Solitary, touching *Weight*. 789

WEigh *Iron* and *Aqua Fortis*, severally; Then dissolve the *Iron* in the *Aqua Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good *Weight*, as the *Bodies* did severally: Notwithstanding a good deale of Wast, by a thick *Vapour*, that issueth during the *Working*: Which sheweth, that the *Opening* of a *Body*, doth increase the *Weight*. This was tried once, or twice, but I know not, whether there were any *Errour*, in the *Triall*.

Experiment Solitary, touching the *Super-Natation* of *Bodies*. 790

TAke of *Aqua-Fortis* two *Ounces*, of *Quick-silver* two *Drachmes*, (For that Charge the *Aqua-Fortis* will beare;) The *Dissolution* will not beare a *Pline*, as big as a *Nutmeg*: Yet (no doubt) the Increasing of the *weight* of *Water*, will increase his *Power* of *Bearing*; As we see *Broine*, when it is Salt enough, will beare an *Egge*. And I remember well a *Physitian*, that used to give some Minerall *Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in Ordinary *Water*. But it seemeth, the *Weight* of the *Quick-silver*, more than the *Weight* of a *Stone*; doth not compense the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment Solitary, touching the *Flying* of *Unequall Bodies* in the *Aire*. 791

LEt there be a Body of *Unequall weight*; (As of *Wood* and *Lead*, or *Stone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *Weightier End* will recover to be Forwards; Unlesse the *Body* be Over-long. The *Cause* is, for that the more *Dense Body*, hath a more Violent *Pressure* of the Parts, from the first *Impulsion*; Which is the *Cause*, (though heretofore not found out, as hath bin often said,) of all *Violent Motions*. And when the *Hinder Part* moveth swifter, (for that it lesse endureth *Pressure* of *Parts*;) than the *Forward Part* can make way for it, in must needs be, that the *Body* turne over: For (turned) it can more easily draw forward the *Lighter* Part. *Galileus* noteth it well; That if an *Open Trough*, wherein *Water* is, be driven faster than the *Water* can

can follow, the *water* gathereth upon an heape, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* over-runneth the *Water*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequalitie* of the *Pressure* of *Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *Wood*, of the same *Magnitude*, and *Shape*, and throw them with equall Force, you cannot possibly throw the *Wood*, so farre, as the *Stone*, or *Iron*.

Experiment Solitary, touching *Water*, that it may be the *Medium* of *Sounds*. 792

IT is certaine, (as it hath beene formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottome* of the *Water*, it maketh a *Sound*. So a long *Pole* strucke upon *Gravell*, in the *Bottome* of the *Water*, maketh a *Sound*. Nay, if you should thinke that the *Sound* commeth up by the *Pole*, and not by the *Water*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no Solide *Body*, whereby the *Sound* can ascend.

Experiment Solitary, of the *Flight* of the *Spirits* upon *Odious Objects*. 793

ALL *Objects* of the *Senses*, which are very *Offensive*, doe cause the *Spirits* to retire; And upon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horrour*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the *Body* Shiver. For *Tastes*, we see that in the Taking of a *Potion*, or *Pills*, the *Head*, and the *Necke* shake. For *Odious Smells*, the like Effect followeth, which is lesse perceived, because there is a Remedy at hand, by Stopping of the *Nose*: But in *Horses*, that can use no such Helpe, we see the *Smell* of a *Carrion*, especially of a *Dead Horse*, maketh them fly away, and take on, almost as if they were Mad. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilnesse* or *Shivering* in all the *Body*. And even in *Sight*, which hath (in effect) no *Odious Object*, Comming into *Sudden Darknesse*, induceth an *Offer* to *Shiver*.

Experiment Solitary, touching the *Super-Reflexion* of *Eccho's*. 794

THere is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath Windows only from above: It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neare Fifty; Having a *Doore* in the Middest. It reporteth the *Voice*, twelve or thirteene times, if you stand by the Close *End-wall*, over against the *Doore*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* soundeth, as if it came from above the *Doore*. And if you stand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you stand in the *Doore*, or in the *Middest* just over against the *Doore*, not. Note that all *Eccho's* sound better against *Old walls*, than *New*; Because they are more *Dry*, and *Hollow*.

Experiment Solitary, touching the *Force of Imagination, Imitating* that of the *Sense*. 795

THose *Effects*, which are wrought by the *Percussion* of the *Sense*, and by *Things* in *Fact*, are produced likewise, in some degree, by the *Imagination*. Therefore if a Man see another eat *Soure* or *Acide Things*, which set the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that he that seeth the *Thing* done by another, hath his owne *Teeth* also set on edge: So if a Man see another turne swiftly, and long; Or if he looke upon *Wheeles* that turne, Himselfe waxeth *Turne-sicke*. So if a Man be upon an *High Place*, without *Railes*, or good Hold, except he be used to it, he is Ready to Fall: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many upon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, Themselves are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment Solitary, touching *Preservation* of *Bodies*. 796

TAke a *Stocke-Gilly-Flower*, and tye it gently upon a Sticke, and put them both into a *Stoope Glasse*, full of *Quick-silver*, so that the *Flower* be covered: Then lay a little *Weight* upon the Top of the *Glasse*, that may keepe the Sticke downe; And looke upon them after foure or five dayes; And you shall finde the *Flower* Fresh, and the *Stalke* Harder, and lesse *Flexible*, than it was. If you compare it with another *Flower*, gathered at the same time, it will be the more manifest. This sheweth, that *Bodies* doe preserve excellently in *Quick-silver*; And not preserve onely, but, by the *Coldnesse* of the *Quick-silver*, *Indurate*; For the *Freshnesse* of the *Flower* may be meerely *Conservation*; (which is the more to be observed, because the *Quick-silver* presseth the *Flower*;) But the *Stiffenesse* of the *Stalke*, cannot be without *Induration*, from the Cold (as it seemeth,) of the *Quick-silver*.

Experiment Solitary, touching the *Growth*, or *Multiplying* of *Metalls*. 797

IT is reported by some of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the Ground, if it be well *Watered*, will increase into *Greater Peeces*. This is certaine, and knowne of Old; That *Lead* will multiply, and Increase; As hath beene seene in *Old Statuas* of *Stone*, which have beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time,) there appeared, that the *Lead* did swell; Insomuch as it hanged upon the *Stone* like *Warts*.

Experiment Solitary, touching the *Drowning* of the more *Base Metall* in the more *Precious*. 798

ICall *Drowning* of *Metalls*, when that the *Baser Metall*, is so incorporate with the more *Rich*, as it can by no Meanes be separated againe: which is a kinde of *Version*, though False: As if *Silver* should be inseparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Silver*. The Ancient *Electrum* had in it a Fifth of *Silver* to the *Gold*; And made a *Compound Metall*, as fit for most uses, as *Gold*; And more Resplendent, and more Qualified in some other Properties; But then that was easily Separated. This to doe privily, or to make the *Compound* passe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it be done Avowedly, and without Disguizing, it may be a great *Saving* of the

the *Richer Metall*. I remember to have heard of a Man, skilfull in *Metalls*, that a Fifteenth Part of *Silver*, incorporate with *Gold*, will not be Recovered by any *Water* of *Separation*; Except you put a Greater *Quantitie* of *Silver*, to draw to it the Lesse; which (he said) is the last Refuge in *Separations*. But that is a tedious way, which no Man (almost) will thinke on. This would be better enquired; And the *Quantitie* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Silver* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Silver*, (*Lead* being the *Weightier Metall*,) will not be detected; If you take so much the more *Silver*, as will countervaile the *Over-weight* of the *Lead*.

Experiment Solitary, touching *Fixation* of *Bodies*. 799

Gold is the onely *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficultie. The *Melting* sheweth that it is not Jejune, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Coacervation* of them: Whereby they have the lesse Appetite, and no Meanes (at all) to issue forth. It were good therefore to try, whether *Glasse Re-moulten* doe leese any *Weight*? For the *Parts* in *Glasse* are evenly Spred; But they are not so Close as in *Gold*; As we see by the Easie Admission of *Light*, *Heat*, and *Cold*; And by the *Smalnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which have little, or no *Spirit*: So as there is nothing to fly out; As we see in the *Stuffe*, whereof *Coppells* are made; Which they put into *Furnaces*; Upon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The *Even Spreading* both of the *Spirits*, and *Tangible Parts*; The *Closeness* of the *Tangible Parts*; And the *Ieiunenesse* or *Extreme Comminution* of *Spirits*: Of which Three, the Two First may be ioyned with a *Nature Liquefiable*; The Last not.

Experiment Solitary, touching the *Restlesse Nature* of Things in *Themselves*, and their *Desire* to *Change*. 800

IT is a Profound *Contemplation* in *Nature*, to consider of the *Emptinesse*, (as we may call it,) or *Insatisfaction* of severall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it, with a kinde of Thirst, as not satisfied with his owne former Consistence; For else it would never receive them in so suddenly, and easily. *Water*, and all *Liquours*, doe hastily receive *Dry* and more *Terrestriall Bodies*, Proportionable: And *Dry Bodies*, on the other side, drinke in *Waters*, and *Liquours*: So that, (as it was well said by one of the *Ancients*, of *Earthy* and *Watry Substances*,) *One is a Glue to another*. *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquours*, though themselves be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Ashes*; Nor apparently Porous: *Metalls* themselves doe receive in readily *Strong-Waters*; And *Strong-Waters* likewise doe readily pierce into *Metalls*, and *Stones*: And that *Strong-Water* will touch upon *Gold*, that will not touch upon *Silver*; And *è converso*. And *Gold*, which

which seemeth by the *Weight*, to be the Closest, and most Solide *Body*, doth greedily drinke in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Consent. Of the *Cause* of this, and to what *Axiome* it may be referred, consider attentively; For as for the Pretty Assertion, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *Wandring Notion*. Onely *Flame* doth not content it selfe to take in any other *Body*; But either, to overcome and turne another *Body* into it Selfe, as by Victory; Or it Selfe to dye, and goe out.

NATU-

NATVRALL HISTORIE.

IX. Century.

Experiments in Consort, touching *Perception* in *Bodies Insensible*, tending to *Naturall Divination*, or *Subtill Trials*.

IT is certaine, that all *Bodies* whatsoever, though they have no *Sense*, yet they have *Perception*: For when one *Body* is applied to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* be *Alterant*, or *Altered*, evermore a *Perception* precedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception*, in some Kinde of *Bodies*, is farre more Subtill than the *Sense*; So that the *Sense* is but a dull Thing in Comparison of it: Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as upon the *Touch*; As when the *Load-Stone* draweth *Iron*; or *Flame*

Flame fireth *Naphtha* of *Babylon*, a great distance off. It is therefore a *Subject* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Sense*; And sometimes Better. And besides, it is a Principall *Meanes* of *Naturall Divination*; For that which in these *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true also, that it serveth to *discover* that which is *Hid*, as well as to *foretell* that which is to *Come*; As it is in many *Subtill Trialls*; As to trie whether *Seeds* be old, or new, the *Sense* cannot informe: But if you boile them in *Water*, the New *Seeds* will sprout sooner: And so of *Water*, the *Taste* will not discover the best *Water*; But the *Speedy Consuming* of it, and many other *Meanes*, which we have heretofore set downe, will discover it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discover those *Naturall Inclinations* of the *Minde*, which *Dissimulation* will conceale, or *Discipline* will suppresse. Wee shall therefore now handle onely, those two *Perceptions*, which pertaine to *Naturall Divination*, and *Discovery*: Leaving the Handling of *Perception* in other Things, to be disposed Elsewhere. Now it is true, that *Divination* is attained by other *Meanes*; As if you know the *Causes*; if you know the *Concomitants*; you may judge of the *Effect* to follow: And the like may be said of *Discovery*; But we tie our Selves here, to that *Divination* and *Discovery* chiefly, which is Caused by an *Early*, or *Subtill Perception*.

The *Aptnesse* or *Propension* of *Aire*, or *Water*, to Corrupt or Putrifie, (no doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blasting*, or the like. Wee will therefore set downe some *Prognosticks* of *Pestilentiall* and *Unwholsome Yeares*.

801 The *Wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Cake-Apple*; have beene spoken of before. Also the *Plenty* of *Frogs*, *Grashoppers*, *Flies*, and the like *Creatures* bred of *Putrefaction*, doth portend *Pestilentiall Yeares*.

802 *Great*, and *Early Heates* in the *Spring*, (and namely in *May*,) without *Winds*, portend the same; And generally so doe *Yeares* with little *Wind*, or *Thunder*.

Great

803 *Great Droughts* in *Summer*, lasting till towards the *End* of *August*, and some *Gentle Showers* upon them; And then some *Drie Weather* againe; Doe portend a *Pestilent Summer*, the *Yeare* following: For about the *End* of *August*, all the *Sweetnesse* of the *Earth*, which goeth into *Plants*, and *Trees*, is exhaled; (And much more if the *August* be dry;) So that nothing then can breathe forth of the *Earth*, but a grosse *Vapour*, which is apt to Corrupt the *Aire*: And that *Vapour*, by the first *Showres*, if they be *Gentle*, is released, and commeth forth abundantly. Therefore they that come abroad soone after those *Showres*, are commonly taken with *Sicknesse*: And in *Affricke*, no Body will stirre out of doores, after the first *Showres*. But if the *Showres* come vehemently, then they rather wash and fill the *Earth*, than give it leave to breathe forth presently. But if *Drie Weather* come againe, then it fixeth and continueth the *Corruption* of the *Aire*, upon the first *Showres* begun; And maketh it of ill *Influence*, even to the Next *Summer*; Except a very *Frostie Winter* discharge it; Which seldome succeedeth such *Droughts*.

804 The *Lesser Infections*, of the *Small Pockes*, *Purple Fevers*, *Agues*, in the *Summer Precedent*, and hovering all *Winter*, doe portend a great *Pestilence* in the *Summer* following; For *Putrefaction* doth not rise to his height at once.

805 It were good to lay a *Peece* of *Raw Flesh*, or *Fish*, in the *Open Aire*; And if it Putrefie quickly, it is a *Signe* of a *Disposition* in the *Aire* to *Putrefaction*. And because you cannot be informed, whether the *Putrefaction* be quicke or late, except you compare this *Experiment* with the like *Experiment* in another *Yeare*, it were not amisse, in the same *Yeare*, and at the same *Time*, to lay one *Peece* of *Flesh*, or *Fish*, in the *Open Aire*, and another of the same Kinde and Bignesse, within *Doores*: For I Judge, that if a generall *Disposition* be in the *Aire* to Putrefie, the *Flesh*, or *Fish*, will sooner Putrefie abroad, where the *Aire* hath more power, than in the *House*, where it hath lesse, being many wayes corrected. And this *Experiment* would be made about the *End* of *March*: For that *Season* is likest to discover, what the *Winter* hath done; And what the *Summer* following will doe upon the *Aire*. And because the *Aire* (no doubt) receiveth great *Tincture*, and *Infusion* from the *Earth*; It were good to trie that *Exposing* of *Flesh*, or *Fish*, both upon a *Stake* of *Wood*, some height above the *Earth*, and upon the *Flat* of the *Earth*.

806 Take *May-Dew*, and see whether it putrifie quickly, or no? For that likewise may disclose the *Qualitie* of the *Aire*, and *Vapour* of the *Earth*, more or lesse *Corrupted*.

807 A *Drie March*, and a *Drie May*, portend a *Wholesome Summer*, if there be a *Showring Aprill* betweene: But otherwise, it is a *Signe* of a *Pestilentiall Yeare*.

808 As the *Discoverie* of the *Disposition* of the *Aire*, is good for the *Prognosticks* of *Wholesome*, and *Unwholesome Yeares*; So it is of much more use, for the *Choice* of *Places* to dwell in: At the least, for *Lodges*, and *Retiring Places* for *Health*; (For *Mansion Houses* respect *Provisions*, as well

as

as *Health*.) Wherein the *Experiments* above mentioned may serve.

809 But for the *Choice* of *Places*, or *Seats*, it is good to make Triall, not only of *Apteſſe* of *Aire* to corrupt, but alſo of the *Moiſture* and *Drineſſe* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may conſtitute *Health* diverſly. We ſee that there be ſome *Houſes*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainſcoats* will alſo ſweat more; ſo that they will almoſt run with *Water*: All which, (no doubt,) are cauſed chiefly by the *Moiſtneſſe* of the *Aire*, in thoſe *Seats*. But becauſe it is better to know it, before a *Man* buildeth his *Houſe*, than to finde it after, take the *Experiments* following.

810 Lay *Woull*, or a *Sponge*, or *Bread*, in the *Place* you would trie, comparing it with ſome other *Places*; And ſee whether it doth not moiſten, and make the *Woull*, or *Sponge*, &c. more Ponderous, than the other? And if it doe, you may judge of that Place, as Situate in a *Groſſe*, and *Moiſt Aire*.

811 Becauſe it is certaine, that in ſome *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more Unequall, than in Others; And *Inequalitie* of *Aire* is ever an Enemy to *Health*; It were good to take two *Weather-Glaſſes*, Matches in all things, and to ſet them, for the ſame Houres of One day, in ſeverall *Places*, where no *Shade* is, nor *Incloſures*: And to marke, when you ſet them, how farre the *Water* commeth; And to compare them, when you come againe, how the *water* ſtandeth then: And if you finde them *Vnequall*, you may be ſure that the *Place* where the *Water* is loweſt, is in the *Warmer Aire*, and the other in the *Colder*. And the greater the *Inequalitie* be, of the *Aſcent*, or *Deſcent* of the *Water*, the greater is the *Inequalitie* of the *Temper* of the *Aire*.

812 The *Predictions* likewiſe of *Cold* and *Long Winters*, and *Hot* and *Drie Summers*, are good to be knowne; As well for the *Diſcoverie* of the *Cauſes*, as for divers *Proviſions*. That of *Plenty* of *Hawes*, and *Heps*, and *Briar-Berries*, hath beene ſpoken of before. If *Wainſcoat*, or *Stone*, that have uſed to Sweat, be more drie, in the Beginning of *Winter*; Or the *Drops* of the *Eaues* of *Houſes* come more ſlowly downe, than they uſe; it portendeth a *Hard* and *Froſtie Winter*. The *Cauſe* is, for that it ſheweth an *Inclination* of the *Aire*, to *Drie weather*; which in *Winter* is ever joyned with *Froſt*.

813 Generally, a *Moiſt* and *Coole Summer*, portendeth a *Hard Winter*. The *Cauſe* is, for that the *Vapours* of the *Earth*, are not diſſipated in the *Summer*, by the *Sunne*; And ſo they rebound upon the *Winter*.

814 A *Hot* and *Drie Summer*, and *Autumne*, and eſpecially if the *Heat* and *Drought* extend farre into *September*, portendeth an Open Beginning of *Winter*; And *Colds* to ſucceed, toward the latter Part of the *Winter*, and the Beginning of the *Spring*: For till then, the former *Heat* and *Drought* beare the Sway; And the *Vapours* are not ſufficiently Multiplied.

815 An *Open* and *Warme Winter* portendeth a *Hot* and *Drie Summer*: For the *Vapours* diſperſe into the *winter Showres*; Whereas *Cold* and *Froſt* keepeth

keepeth them in, and tranſporteth them into the late *Spring*, and *Summer* following.

Birds that uſe to change *Countries*, at certaine *Seaſons*, if they come Earlier, doe ſhew the *Temperature* of *Weather*, according to that *Country* whence they came: As the *winter-Birds*, (namely, *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with us ſhew *Cold Winters*. And if it be in the ſame *Country*, then they ſhew a *Temperature* of *Seaſon*, like unto that *Seaſon* in which they come: As *Swallowes*, *Bats*, *Cuckooes*, &c. that come towards *Summer*, if they come early, ſhew a *Hot Summer* to follow. 816

The *Prognoſticks*, more Immediate, of *weather* to follow ſoone after, are more Certaine than thoſe of *Seaſons*. The *Reſounding* of the *Sea* upon the *Shoare*; And the *Murmur* of *Winds* in the *Woods*, without apparent *wind*; ſhew *Wind* to follow: For ſuch *winds*, breathing chiefly out of the *Earth*, are not at the firſt perceived, except they be pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Caves* likewiſe portendeth as much. 817

The *Vpper Regions* of the *Aire*, perceive the *Collection* of the *Matter* of *Tempeſt*, and *Winds*, before the *Aire* here below: And therefore the *obſcuring* of the *Smaller Starres* is a *Signe* of *Tempeſts* following. And of this kinde you ſhall finde a Number of *Inſtances* in our *Inquiſition De Ventis*. 818

Great Mountaines have a *Perception* of the *Diſpoſition* of the *Aire* to *Tempeſts*, ſooner than the *Valley's* or *Plaines* below: And therefore they ſay in *wales*, when certaine *Hills* have their *Night-Caps* on, they meane Miſchiefe. The *Cauſe* is, for that *Temp-ſts*, which are for the moſt part bred above, in the *Middle Region*, (as they call it,) are ſooneſt perceived to collect in the *Places* next it. 819

The *Aire*, and *Fire*, have *Subtill Perceptions* of *Wind* riſing, before *Men* finde it. We ſee the *Trembling* of a *Candle* will diſcover a *Wind* that otherwiſe we doe not feele; And the *Flexuous Burning* of *Flames* doth ſhew the *Aire* beginneth to be unquiet; And ſo doe *Coales* of *Fire* by Caſting off the *Aſhes* more than they uſe. The *Cauſe* is, for that no *Wind*, at the firſt, till it hath ſtrooke and driven the *Aire*, is Apparent to the *Senſe*: But *Flame* is eaſier to move, than *Aire*: And for the *Aſhes*, it is no marvell, though *Wind* unperceived ſhake them off; For wee uſually trie, which way the *Wind* bloweth, by caſting up *Graſſe*, or *Chaffe*, or ſuch light Things, into the *Aire*. 820

When *Wind* expireth from under the *Sea*; As it cauſeth ſome *Reſounding* of the *Water*, (whereof wee ſpake before,) ſo it cauſeth ſome *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cauſe* is, for that the *Wind* cannot be perceived by the *Senſe*, untill there be an *Eruption* of a great *Quantitie*, from under the *Water*; And ſo it getteth into a *Body*: Whereas in the firſt *Putting up* it commeth in little Portions. 821

Wee ſpake of the *Aſhes*, that *Coales* caſt off; And of *Graſſe*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moveth, when we finde no 822

Wind, sheweth a *Wind* at hand. As when *Feathers*, or *Downe* of *Thistles*, fly to and fro in the *Aire*.

817 For *Prognosticks* of *Weather* from *Living Creatures*, it is to be noted: That *Creatures* that live in the *Open Aire*, (*Sub Dio*,) must needs have a Quicker *Impression* from the *Aire*, than *Men* that live most within *Doores*; And especially *Birds*, who live in the *Aire*, freest, and Cleerest; And are aptest by their *Voice* to tell Tales, what they finde; And likewise by the *Motion* of their *Flight*, to expresse the same.

818 *Water-Fowles*, (as *Sea-Gulls*, *Moore-Hens*, &c.) when they flocke and fly together, from the *Sea* towards the *Shore*; And contrariwise, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *Waters* with their *Wings*; doe fore-shew *Raine*, and *Wind*. The *Cause* is, *Pleasure*, that both Kindes take in the *Moistnesse*, and *Densitie* of the *Aire*: And so desire to be in *Motion*, and upon the *Wing*, whither soever they would otherwise goe: For it is no Marvell, that *Water-Fowle* doe joy most in that *Aire*, which is likest *Water*; And *Land-Birds*, also (many of them,) delight in *Bathing*, and *Moist Aire*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seeme to call upon *Rhine*: All which is but the Comfort they seeme to receive in the *Relenting* of the *Aire*.

819 The *Kyte*, when she soareth high, (so as sometimes she is seene to passe over a *Cloud*,) sheweth *Winds*: But *Kites* flying aloft, shew *Faire* and *Dry Weather*. The *Cause* may be, for that they both mount most into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleasure in the *Aire*, that is Condensed: And besides, being but Heavy of *Wing*, needeth the Helpe of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossenesse* of the *Aire*, as the *Cold* and *Freshnesse* thereof; For being a *Bird* of *Prey*, and therefore *Hot*, she delighteth in the *Fresh Aire*; And (many times) flyeth against the *Wind*; As *Trouts*, and *Salmons* swimme against the Streame. And yet it is true also, that all *Birds* finde an Ease in the depth of the *Aire*; As *Swimmers* doe in a Deepe *Water*. And therefore when they are aloft, they can uphold themselves with their *Wings Spred*, scarce moving them.

820 *Fishes*, when they play towards the *Top* of the *water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Dry*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Dry*, will fly it, and *Swimme* Lower.

821 *Beasts* doe take Comfort, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get up betimes in the Morning, to feed, against *Raine*: And *Cattell*, and *Deere*, and *Conyes*, will feed hard before *Raine*: And a *Heifer*, will put up his *Nose*, and snuffe in the *Aire*, against *Raine*.

The

The *Trifoile*, against *Raine*, swelleth in the *Stalke*; and so standeth more upright; For by *Wet*, *Stalkes* doe erect, and *Leaves* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Countrey People call the *Wincopipe*; Which if it open in the *Morning*, you may be sure of a faire *Day* to follow. 827

Even in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieve, either towards *Raine*, or towards *Frost*: For the One maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we see both *Extremes* bring the *Gout*. 828

Wormes, *Vermine*, &c. doe fore-shew (likewise) *Raine*: For *Earth-wormes* will come forth, and *Moules* will cast up more, and *Fleas* bite more, against *Raine*. 829

Solide Bodies likewise fore-shew *Raine*. As *Stones*, and *Wainscot*, when they *Sweat*: And *Boxes*, and *Peggs* of *Wood*, when they Draw, and *Wind hard*; Though the Former be but from an Outward Cause; For that the *Stone*, or *Wainscot*, turneth and beateth backe the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe. 830

Experiment Solitary, touching the *Nature* of *Appetite* in the *Stomach*. 831

Appetite is moved chiefly by Things that are *Cold*, and *Dry*; The *Cause* is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth upon Supply; And so is *Drinesse*: And therefore all *Soure Things*, (as *Vinegar*, *Iuyce* of *Limons*, *Oyle* of *Vitriol*, &c.) provoke *Appetite*. And the *Disease*, which they call *Appetitus Caninus*, consisteth in the *Matter* of an *Acide* and *Glassy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moved by *Soure Things*; For that *Soure Things*, induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; Which is a great *Cause* of *Appetite*. As for the *Cause*, why *Onions*, and *Salt*, and *Pepper*, in Baked Meats, move *Appetite*, it is by *Vellication* of those *Nerves*; For *Motion* whetteth. As for *Worme-wood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they move *Appetite* by *Abstersion*. So as there be foure Principall *Causes* of *Appetite*; The *Refrigeration* of the *Stomach*, joyned with some *Drinesse*; *Contraction*; *Vellication*; And *Abstersion*: Besides *Hunger*, which is an *Emptinesse*: And yet *Over-Fasting* doth (many times) cause the *Appetite* to cease; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And such *Humours* as are Light, and Cholericke, which quench *Appetite* most.

Experiment Solitary, touching *Sweetnesse* of *Odour* from the *Rainbow*. 832

It hath beene observed by the *Ancients*, that where a *Raine-Bow* seemeth to hang over, or to touch, there breatheth forth a *Sweet Smell*. The *Cause* is, for that this happeneth but in certaine Matters, which have in themselves some *Sweetnesse*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they also make the *Ground* Sweet: But none are so delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be also, that the *Water* it selfe hath some *Sweetnesse*: For the *Raine-Bow* consisteth of a *Glomeration* of *Small Drops*, which cannot possibly fall, but from the *Aire*, that is very *Low*: And there-

therefore may hold the verie *Sweetneſſe* of the *Herbs*, and *Flowers*, as a *Diſtilled Water*: For *Raine*, and other *Dew*, that fall from high, cannot preſerve the Smell, being diſſipated in the drawing up: Neither doe we know, whether ſome *water* it ſelfe, may not have ſome degree of *Sweetneſſe*. It is true, that wee finde it ſenſibly in no *Poole*, *River*, nor *Fountaine*; But good *Earth*, newly turned up, hath a *Freſhneſſe*, and good *Sent*; Which *water*, if it be not too *Equall*, (For *Equall Objects* never move the *Senſe*,) may alſo have. Certaine it is, that *Bay-Salt*, which is but a kinde of *water Congealed*, will ſometimes ſmell like *Violets*.

Experiment Solitary, touching *Sweet Smells*.

833

TO *Sweet Smells Heat* is requiſite, to Concoct the *Matter*; And ſome *Moiſture* to Spread the *Breath* of them. For *Heat*, we ſee that *Woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moiſture*, we ſee that Things too much Dried, loſe their *Sweetneſſe*: And *Flowers* growing, ſmell better in a *Morning*, or *Evening*, than at *Noone*. Some *Sweet Smells* are deſtroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pinckes*; And generally all *Flowers* that have *Coole* and *Delicate Spirits*. Some continue both on the *Fire*, & from the *Fire*; As *Roſe-water*, &c. Some doe ſcarce come forth, or at leaſt not ſo pleaſantly, as by meanes of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Encloſed in a *Faſt Body*: But (generally) thoſe *Smells* are the moſt Grateſull, where the *Degree* of *Heat* is Small; Or where the *Strength* of the *Smell* is allayed; For theſe *Things* doe rather woo the *Senſe*, than Satiate it. And therefore the *Smell* of *Violets*, and *Roſes*, exceedeth in *Sweetneſſe* that of *Spices*, and *Gummes*; And the Strongeſt Sort of *Smells*, are beſt in a weft, a farre off.

Experiment Solitary, touching the *Corporeall Subſtance of Smells*.

834

IT is certaine, that no *Smell* iſſueth, but with *Emiſſion* of ſome *Corporeall Subſtance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For we ſee plainly, that *Smell* doth ſpread nothing that diſtance, that the other doe. It is true, that ſome *woods* of *Orenges*, and *Heathes* of *Roſe-Mary*, will Smell a great way into the *Sea*, perhaps twentie Miles; But what is that, ſince a *Peale* of *Ordnance* will doe as much, which moveth in a ſmall compaſſe? Whereas thoſe *Woods*, and *Heathes*, are of Vaſt Spaces: Beſides wee ſee that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloves*, &c. which ſheweth them *Corporeall*; And doe Laſt a great while, which *Sounds*, and *Light* doe not.

Experiment Solitary, touching *Fetide* and *Fragrant Odours*.

835

THe *Excrements* of moſt *Creatures* Smell ill; Chiefly to the ſame *Creature* that voideth them: For we ſee, beſides that of *Man*, that *Pigeons*, and *Horſes* thrive beſt, if their *Houſes*, and *Stables* be kept Sweet; And ſo of *Cage-Birds*: And the *Cat* burieth that which ſhee voideth: And it holdeth chiefly in thoſe *Beaſts*, which feed upon *Fleſh*. *Dogs* (almoſt) onely of *Beaſts*, delight in *Fetide Odours*; Which ſheweth there is ſomewhat in their *Senſe* of *Smell*, differing from the *Smells* of other *Beaſts*. But the *Cauſe*, why *Excrements* ſmell ill, is manifeſt; For that the *Body*

Body it ſelfe rejecteth them; Much more the *Spirits*: And we ſee, that thoſe *Excrements*, that are of the *Firſt Digeſtion*, Smell the worſt; As the *Excrements* from the *Belly*: Thoſe that are from the *Second Digeſtion*, leſſe ill; As *Vrine*; And thoſe that are from the *Third*, yet leſſe; For *Sweat* is not ſo bad, as the other two; Eſpecially of ſome *Perſons*, that are full of *Heat*. Likewiſe moſt *Putrefactions* are of an *Odious Smell*: For they ſmell either *Fetide*, or *Mouldy*. The *Cauſe* may be, for that *Putrefaction* doth bring forth ſuch a *Conſiſtence*, as is moſt Contrarie to the *Conſiſtence* of the *Body*, whilſt it is Sound: For it is a meere diſſolution of that *Forme*. Beſides, there is another Reaſon which is Profound: And it is, that the *Objects* that pleaſe any of the *Senſes*, have (all) ſome *Equalitie*, and (as it were) *Order*, in their *Compoſition*: But where thoſe are wanting, the *Object* is ever Ingrate. So *Mixture* of many *Diſagreeing Colours* is ever unpleaſant to the *Eye*: *Mixture* of *Diſcordant Sounds* is unpleaſant to the *Eare*: *Mixture*, or *Hotch-Potch* of many *Taſtes*, is unpleaſant to the *Taſte*: *Harſhneſſe* and *Ruggednеſſe* of *Bodies*, is unpleaſant to the *Touch*: Now it is certaine, that all *Putrefaction*, being a *Diſſolution* of the firſt *Forme*, is a meere *Confuſion*, and *Vnformed Mixture* of the *Part*. Nevertheleſſe, it is ſtrange, and ſeemeth to Groſſe the former *Obſervation*; that ſome *Putrefactions* and *Excrements*, doe yeeld *Excellent Odours*; As *Civet*, and *Muske*; And as ſome thinke *Amber-Greece*: For divers take it, (though unprobably,) to come from the *Sperme* of *Fiſh*: And the *Moſſe*, we ſpake of from *Apple-Trees*, is little better than an *Excretion*. The Reaſon may be, for that there paſſeth in the *Excrements*, and remaineth in the *Putrefactions*, ſome good *Spirits*; eſpecially where they proceed from *Creatures*, that are verie *Hot*. But it may be alſo joyned with a further *Cauſe*, which is more Subtill; And it is, that the *Senſes* love not to be Overpleaſed: But to have a *Commixture* of ſomewhat that is in it ſelfe Ingrate. Certainly, we ſee how *Diſcords*, in *Muſicke*, falling upon *Concords*, make the *Sweeteſt Straines*: And we ſee againe, what Strange *Taſtes* delight the *Taſte*; As *Red-Herrings*, *Caveary*, *Parmizan*, &c. And it may be, the ſame holdeth in *Smells*. For thoſe kinde of *Smells*, that we have mentioned, are all Strong, and doe Pull and Vellicate the *Senſe*. And wee finde alſo, that *Places* where Men *Vrine*, commonly have ſome *Smell* of *Violets*: And *Vrine*, if one hath eaten *Nutmeg*, beth ſo too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Conjugations*; Of the *Influences* of *Heaven*; Of *Heat*, *Cold*, *Moiſture*, *Drought*, *Qualities Active*, *Paſſive*; And the like, have ſwallowed up the true *Paſſages*, and *Proceſſes*, and *Affects*, & *Conſiſtences* of *Matter*, and *Naturall Bodies*. Therefore they are to be ſet aſide, being

but *Notionall*, and *ill Limited*; And Definite *Axiomes* are to be drawne out of *Measured Instances*: And so Assent to be made to the more *Generall Axiomes*, by *Scale*. And of these Kindes of *Processes* of *Natures*, and *Characters* of *Matter*, we will now set downe some *Instances*.

Experiment Solitary, touching the *Cause* of *Putrefaction*. 836

ALL *Putrefactions* come chiefly from the *Inward Spirits* of the *Body*, And partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatsoever else: And this last, by two *Meanes*: Either by *Ingresse* of the *Substance* of the *Ambient Bodie*, into the *Body Putrified*; Or by *Excitation* and *Solicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Received Opinion, that *Putrefaction* is caused, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but Nugation: For *Cold* in *Things Inanimate*, is the greatest Enemie that is, to *Putrefaction*, though it extinguisheth *Vivification*, which ever consisteth in *Spirits Actuated*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Adventitious Heat* be greatly Predominant, to the *Naturall Heat*, and *Spirits* of the *Body*, it tendeth to *Dissolution*, or Notable *Alteration*. But this is wrought by *Elision*, or *Suppression*, or *Suffocation*, of the *Native Spirits*; And also by the *Disordination*, and *Discomposture* of the *Tangible Parts*; And other *Passages* of *Nature*; And not by a *Conflict* of *Heats*.

Experiment Solitary, touching *Bodies Imperfectly Mixt*. 837

IN *Imperfect*, or *Meane Alterations* of *Bodies*, there is a *Medium* betweene the *Body* and it is new first, and the *Body Resulting*; which *Medium* is *Corpus imperfectè Consistens*, and is Transitorie, and not durable; As *Mists*, *Smokes*, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the first *Vivification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fully called (by some of the *Ancients*,) *Inquination*, or *Inconcoction*, which hath a Kinde of *Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

Experiment Solitary, touching *Concoction* and *Crudities*. 838

THe second *Condition*, or *Digestion*, is chiefly taken into use from *Living Creatures*, & their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*; *Vrine* and *Excrements Concocted*; And the *Foure Disgestions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Severall Parts* of the *Bodie*;) are likewise called *Concoctions*: And they are all made to be the Workes of *Heat*: All which *Notions* are but ignorant Catches of a few Things, which are most Obvious to *Mens Observations*. The Constant Nature of *Concoction*, is, that it should signifie the *Degrees* of *Alteration* of one *Body* into another, from *Crudity* to *Perfect Concoction*; Which is the *Plenitude* of that *Action*, or *Processe*: And while the *Body* to be *Converted* and *Altered*, is too strong for the *Efficient*, that should *Convert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first *Forme*,

Forme, or *Consistence*,) it is (all that while,) *Crude*, and *Inconcocted*; And the *Processe* is to be called *Crudities* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Worke* of *Heat*; But not the *Worke* of *Heat* alone: For all Things, that further the *Conversion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conversion* and *Subaction*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies* of *Living Creatures*; In which there is an *Absolute Conversion*, and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies* of *Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other, (which is *Maturation*,) is seene in *Liquours*, and *Fruits*; wherein there is not desired, nor pretended, an utter *Conversion*, but onely an *Alteration* to that *Forme*, which is most sought, for *Mans* use; As in *Clarifying* of *Drinkes*; *Ripening* of *Fruits*, &c. But note, that there be two Kindes of *Absolute Conversion*; The one is, when a *Body* is converted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which wee call *Assimilation*. The other is, when the *Conversion* is into a *Bodie* meerely New, and which was not before; As if *Silver* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conversion* is better called, for distinctions sake, *Transmutation*.

Experiment Solitary, touching *Alterations*, which may be called *Majors*. 839

THere are also divers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoever doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Major*: As when *Meat* is Boyled, or Rosted, or Fried, &c. Or when *Bread* and *Meat* are Baked; Or when *Cheese* is made of Curds, or *Butter* of *Creame*, or *Coales* of wood, or *Bricke* of Earth; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Termes*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme*, or *Nomenclature* for it; (as the *Ancients* used;) They be but Shifts of *Ignorance*; For *Knowledge* will be ever *Wrastling* and *Indigested Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from sufficient Number of Instances, and those well collated.

The *Consistences* of *Bodies* are verie divers: *Dense*, *Rare*, *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*, *Hard*, *Soft*; *Cleaving*, Not *Cleaving*; *Congealable*, *Not Congealeable*; *Liquefiable*, *Not Liquefiable*; *Frangible*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawen forth in length, *Intractile*; *Porous*, *Solide*; *Equall*, and *Smooth*, *Unequall*; *Venous*, and *Fibrous*,

brous, and with *Graines*, *Entire*; And divers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, & *Drought*, is a Compendious and Inutile *Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsim* in this our *Sylva Sylvarum*: Nevertheless in some good part, We shall handle divers of them now presently.

Experiment Solitary, touching *Bodies Liquefiable*, and *not Liquefiable*. 840

Liquefiable, and *Not Liquefiable*, proceed from these *Causes*: *Liquefaction* is ever caused by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore such *Bodies*, as are more *Turgide* of *Spirit*; Or that have their *Spirits* more *Straitly Imprisoned*; Or againe that hold them *Better Pleased* and *Content*; are *Liquefiable*: For these three *Dispositions* of *Bodies*, doe arrest the *Emission* of the *Spirits*. An Example of the first two *Properties* is in *Metalls*; And of the last in *Grease*, *Pitch*, *Sulphure*, *Butter*, *Wax*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies Iejune* of *Spirits*; Or which part with their *Spirits* more *Willingly*; are not *Liquefiable*; As *Wood*, *Clay*, *Freestone*, &c. But yet, even many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Soften*; As *Iron* in the Forge; And a *Sticke* bathed in Hot Ashes, which thereby becommeth more Flexible. Moreover, there are some *Bodies*, which doe *Liquefie*, or dissolve by *Fire*; As *Metalls*, *Wax*, &c. And other *Bodies*, which dissolve in *Water*; As *Salt*, *Sugar*, &c. The *Cause* of the former proceedeth from the *Dilatation* of the *Spirits* by *Heate*. The *Cause* of the Latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receive the *Liquour*. Againe, there are some *Bodies*, that dissolve with both; As *Gumme*, &c. And those be such *Bodies*, as on the One Side have good store of *Spirit*; And on the other Side, have the *Tangible Parts Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the Latter stimulateth the Parts to Receive the *Liquour*.

Experiment Solitary, touching *Bodies Fragile*, and *Tough*. 841

Of *Bodies*, some are *Fragile*; And some are *Tough*, and *Not Fragile*; And in the *Breaking*, some *Fragile Bodies* breake but where the *Force* is; Some shatter and flie in many Peeces. Of *Fragilitie* the *Cause* is an *Impotencie* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And so *Fictile Earth*, is more *Fragile* than *Crude Earth*; And *Dry Wood* than *Greene*. And the *Cause* of this *Fragilitie* to *Extension*, is the Small *Quantitie* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is ever Concomitant with *Fatnesse*, and with *Driness* in the *Tangible Parts*: Contrariwise, *Tough Bodies* have more *Spirit*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore we see that *Parchment*, or *Leather* will stretch, *Paper* will not; *Woollen Cloth* will tenter, *Linnen* scarcely.

All

Experiment Solitary, touching the *Two Kinds* of *Pneumaticals* in *Bodies*. 842

All *Solide Bodies* consist of *Parts* of two severall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Native Spirit* of the *Body*; And in some other, plaine *Aire* that is gotten in; As in *Bodies desiccate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are ever the more *Fragile*; For the *Native Spirit* is more *Yeelding*, and *Extensive*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great Diversitie; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as we call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Insipide*, and without any *Extimulation*.

Experiment Solitary, touching *Concretion*, and *Dissolution* of *Bodies*. 843

The *Concretion* of *Bodies* is (commonly) solved by the *Contrarie*; As *Ice*, which is congealed by *Cold*, is dissolved by *Heat*; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolved by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returnes* to their former *Nature*, than *Alterations*: So that the *Contrarie* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by Contrarie *Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either Meanes, exhaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it be Vehement,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them Swell, than Congeale them: As when *Ice* is congealed in a *Cup*, the *Ice* will Swell in steed of Contracting; And sometimes Rift.

Experiment Solitary, touching *Hard* & *Soft Bodies*. 844

Of *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Iejuneneſſe* of the *Spirits*; And their *Imparitie* with the *Tangible Parts*: Both which, if they be in a greater degree, maketh them, not only *Hard*, but *Fragile*, and lesse Enduring of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Drie Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantitie* of *Spirits*; (which ever helpeth to Induce *Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies*, (as we use the word,) are of two *Kinds*; The one, that easily giveth place to another *Body*, but altereth not *Bulke*, by Rising in other *Places*: And therefore we see that *Wax*, if you put any Thing into it, doth not rise in *Bulke*, but only giveth Place: For you may not thinke, that in *Printing* of *Wax*, the *Wax* riseth up at all; But onely the *depressed Part* giveth place, and the other remaineth as it was. The other, that altereth *Bulke* in the *Cession*; As *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they give place (indeed) easily, but then they rise all over: Which is a False *Cession*; For it is in *Place*, and not in *Body*.

All

Experiment Solitary, touching Bodies Ductile and Tensile.
845

ALL Bodies Ductile, and Tensile, (as Metals that will be drawne into Wires; Wooll and Towe that will be drawne into Yarne, or Thred;) have in them the Appetite of Not Discontinuing, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not to Discontinue or forsake their owne Body. Viscous Bodies, (likewise,) as Pitch, Wax, Bird-Lime, Cheese toasted, will draw forth, and roape. But the difference betweene Bodies Fibrous, and Bodies Viscous, is Plaine; For all Wooll, and Towe, and Cotton, and Silke, (especially raw Silke.) have, besides their Desire of Continuance, in regard of the Tenuitie of their Thred, a Greedinesse of Moisture; And by Moisture to joyne and incorporate with other Thred; Especially if there be a little Wreathing; As appeareth by the Twisting of Thred; And the Practice of Twirling about of Spindles. And wee see also, that Gold and Silver Thred cannot be made without Twisting.

Experiment Solitary, touching other Passions of Matter, and Characters of Bodies.
846

THe Differences of Impressible and Not Impressible; Figurable and Not Figurable; Mouldable and Not Mouldable; Scissible and Not Scissible; And many other Passions of Matter, are Plebeian Notions, applied unto the Instruments and Uses which Men ordinarily practise; But they are all but the Effects of some of these Causes following; Which we will Enumerate without Applying them, because that would be too long. The First is the Cession, or Not Cession of Bodies, into a Smaller Space or Roome, keeping the Outward Bulke, and not flying up. The Second is the Stronger or Weaker Appetite, in Bodies, to Continuitie, and to flie Discontinuitie. The Third is the Disposition of Bodies, to Contract, or Not Contract; And againe, to Extend, or Not Extend. The Fourth is the Small Quantitie, or Great Quantitie, of the Pneumaticall in Bodies. The Fifth is the Nature of the Pneumaticall, whether it be Native Spirit of the Body, or Common Aire. The Sixth is, the Nature of the Native Spirits in the Body, whether they be Active and Eager, or Dull and Gentle. The seventh is the Emission or Detention of the Spirits in Bodies. The Eight is the Dilatation, or Contraction of the Spirits in Bodies, while they are detained. The Ninth is the Collocation of the Spirits in Bodies; whether the Collocation be Equall, or Unequall; And againe, whether the Spirits be Coacervate, or Diffused. The Tenth is the Densitie, or Raritie of the Tangible Parts. The Eleventh is the Equalitie or Inequalitie of the Tangible Parts. The Twelfth is the Digestion, or Cruditie of the Tangible Parts. The Thirteenth is the Nature of the Matter, whether Sulphureous or Mercuriall, Watrie or Oylie, Drie and Terrestriall, or Moist and Liquid; which Natures of Sulphureous and Mercuriall, seeme to be Natures Radicall, and Principall. The Fourteenth is the Placing of the Tangible Parts, in Length, or Transverse; (As it is in the Warpe, and the Woofe, of Textiles;) More Inward, or More Outward; &c. The Fifteenth is the Porositie, or Imporositie betwixt the Tangible Parts; And the Greatnesse, or Smalnesse of the Pores. The Sixteenth is the Collocation and Posture of the Pores. There may be more Causes; but these doe occurre for the Present.

Take

Experiment Solitary, touching Induration by Sympathie.
847

TAke Lead, and melt it, and in the Middest of it, when it beginneth to Congeale, make a little Dint, or Hole, and put Quicke-Silver wrapped in a Peece of Linnen into that Hole, and the Quicke-silver will fix, and run no more, and endure the Hammer. This is a Noble Instance of Induration, by Consent of one Body with another, and Motion of Excitation to Imitate; For to ascribe it onely to the Vapour of Lead, is lesse Probable. Quære whether the Fixing may be in such a degree, as it will be Figured like other Metals? For if so, you may make Works of it for some purposes, so they come not neere the Fire.

Experiment Solitary, touching Honey and Sugar.
848

SUgar hath put downe the use of Honey; Insomuch as wee have lost those Observations, and Preparations of Honey, which the Ancients had, when it was more in Price. First, it seemeth that there was, in old time, Tree-Honey, as well as Bee-Honey; Which was the Teare or Blood issuing from the Tree: Insomuch as one of the Ancients relateth, that in Trebisond, there was Honey issuing from the Box-Trees, which made Men Mad. Againe, in Ancient time, there was a Kinde of Honey, which either of the owne Nature, or by Art, would grow as Hard as Sugar; And was not so Lushious as Ours. They had also a Wine of Honey, which they made thus. They crushed the Honey into a great Quantitie of Water, and then strained the Liquour; After they boyled it in a Copper to the halfe: Then they powred it into Earthen Vessels, for a small time; And after tunned it into Vessels of Wood, and kept it for many yeares. They have also, at this day, in Russia, and those Northerne Countries, Mead Simple, which (well made, and seasoned) is a good wholesome Drinke, and very Cleare. They use also in Wales, a Compound Drinke of Mead, with Herbs, and Spices. But meane-while it were good, in recompence of that we have lost in Honey, there were brought in use a Sugar-Mead, (for so wee may call it,) though without any Mixture at all of Honey; And to brew it, and keepe it stale, as they use Mead; For certainly, though it would not be so Abstersive, and Opening, and Solutive a Drinke as Mead; yet it will be more gratefull to the Stomach, and more Lenitive, and fit to be used in Sharpe Diseases: For wee see, that the use of Sugar in Beere, and Ale, hath good Effects in such Cases.

Experiment Solitary, touching the Finer Sort of Base Metals.
849

IT is reported by the Ancients, that there was a Kinde of Steele, in some places, which would polish almost as white and bright as Silver. And that there was in India a Kinde of Brasse, which (being polished) could scarce be discerned from Gold. This was in the Naturall Ure; But I am doubtfull, whether Men have sufficiently refined Metals, which we count Base; As whether Iron, Brasse, and Tinne, be refined to the Heighth? But when they come to such a Finenesse, as serveth the ordinary use, they trie no further.

Experiment Solitary, touching Cements and Quarries.
850

THere have beene found certaine Cements under Earth, that are very Soft; And yet, taken forth into the Sunne, harden as Hard as Marble: There

There are also ordinary *Quarries* in *Sommerset-Shire*, which in the *Quarry* cut forth to any Bigneſſe, and in the *Building* prove firme, and hard.

Experiment Solitary, touching the *Altering* of the *Colour* of *Hairs* and *Feathers*. 851

Living Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray*, and *White*: As is ſeene in *Men*, though ſome Earlier, ſome Later; In *Horſes*, that are Dappled, and turne *White*; In *Old Squirrels*, that turne *Griſly*; And many Others. So doe ſome *Birds*; As *Cygnets*, from *Gray* turne *white*; *Hawkes*, from *Browne* turne more *White*: And ſome *Birds* there be, that upon their *Moulting*, doe turne *Colour*, As *Robin-Red-breſts*, after their *Moulting*, grow to be *Red* againe, by degrees; So doe *Gold-Finches* upon the *Head*. The *Cauſe* is, for that *Moiſture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drineſſe* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and ſo all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the moſt part,) wax *Hoare* later. Out of this Ground, a *Man* may deviſe the *Meanes* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this ſee the fifth *Experiments*.

Experiment Solitary, touching the *Differences* of *Living Creatures*, *Male* & *Female*. 852

THe *Difference* betweene *Male* and *Female*, in ſome *Creatures*, is not eaſie to be diſcerned, otherwiſe than in the *Parts* of *Generation*: As in *Horſes* and *Mares*, *Dogs* and *Bitches*, *Doves He* and *Shee*, and others. But ſome differ in *Magnitude*, and that diverſly; For in moſt the *Male* is the greater, As in *Men*, *Pheaſants*, *Peacocks*, *Turkey's*, and the like: And in ſome few, as in *Hawkes*, the *Female*. Some differ in the *Haire*, and *Feathers*, both in the *Quantitie*, *Criſpation*, and *Colours* of them; As *He-Lions* are *Hirſute*, and have great *Maines*; The *She's* are ſmooth like *Cats*. *Bulls* are more *Criſpe* upon the *Fore-head* than *Cowes*; The *Peacocke*, and *Pheaſant-Cocke*, and *Gold-Finch-Cocke*, have glorious and fine *Colours*; The *Henn's* have not. Generally, the Hees in *Birds* have the faireſt *Feathers*. Some differ in divers *Features*; As *Bucks* have *Hornes*, *Doe's* none; *Rammes* have more *Wreathed Hornes* than *Ewes*; *Cocks* have great *Combes* and *Spurres*. *Henns* little or none; *Boares* have great *Fangs*, *Sowes* much leſſe; The *Turky-Cocke* hath great and Swelling *Gills*, the *Hen* hath leſſe; *Men* have generally Deeper and Stronger *Voices* than *women*. Some differ in *Facultie*; As the *Cocks* amongſt *Singing Birds*, are the beſt *Singers*. The Chiefe *Cauſe* of all theſe, (no doubt,) is, for that the *Males* have more Strength of *Heat* than the *Females*; Which appeareth manifeſtly in this, that all young *Creatures Males*, are like *Females*; And ſo are *Eunuchs*, and *Gelt Creatures* of all kinds, liker *Females*. Now *Heat* cauſeth *Greatneſſe* of *Growth*, generally, where there is *Moiſture* enough to worke upon: But if there be found in any *Creature*, (which is ſeene rarely,) an Over-great *Heat* in proportion to the *Moiſture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moiſture*, then there is no *Difference* to be ſeene betweene *Male* and *Female*:

male: As in the *Inſtances* of *Horſes*, and *Dogs*. Wee ſee alſo, that the *Hornes* of *Oxen*, and *Cowes*, for the moſt part, are Larger than the *Bulls*; which is cauſed by abundance of *Moiſture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* cauſeth *Vilioſitie*, and *Criſpation*; And ſo likewiſe *Beards* in *Men*. It alſo expelleth finer *Moiſture*, which Want of *Heat* cannot Expell: And that is the *Cauſe* of the *Beautie* and *Varietie* of *Feathers*: Againe *Heat* doth put forth many *Excreſcences*, and much Solide *Matter*, which Want of *Heat* cannot do: And this is the *Cauſe* of *Hornes*, and of the *Greatneſſe* of them; And of the *Greatneſſe* of the *Combs* and *Spurres* of *Cocks*, *Gills* of *Turky-Cocks*, and *Fangs* of *Boares*. *Heat* alſo dilateth the *Pipes*, and *Organs*, which cauſeth the *Deepneſſe* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that cauſeth the *Cock Singing Bird*, to Excell the *Hen*.

Experiment Solitary, touching the *Comparative Magnitude* of *Living Creatures*. 853

THere be *Fiſhes* greater than any *Beaſts*; As the *Whale* is farre greater than the *Elephant*. And *Beaſts* are (generally) greater than *Birds*. For *Fiſhes*, the *Cauſe* may be, that becauſe they Live not in the *Aire*, they have not their *Moiſture* drawne & Soaked by the *Aire*, and *Sun-Beames*. Alſo they reſt alwayes, in a manner, and are ſupported by the *Water*; whereas *Motion* and *Labour* doe conſume. As for the *Greatneſſe* of *Beaſts*, more than of *Birds*, it is cauſed, for that *Beaſts* ſtay Longer time in the *Womb*, than *Birds*, and there Nouriſh, and Grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nouriſhment* from the *Female*: For the *Sitting* doth *Vivifie*, and not Nouriſh.

Experiment Solitary, touching *Exoſſation* of *Fruits*. 854

WE have partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this wee adde further, that the *Cauſe* muſt be *Abundance* of *Moiſture*; For that the *Coare*, and *Stone* are made of a *Dry Sap*: And wee ſee that it is poſſible, to make a *Tree* put forth onely in *Bloſſome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more in *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted upon a *Colewort-Stalke*, ſendeth forth a great *Apple* without a *Coare*. It is not unlikely, that if the *Inward Pith* of a *Tree*, were taken out, ſo that the Juyce came onely by the *Barke*, it would worke the *Effect*. For it hath beene obſerved, that in *Pollards*, if the *Water* get in on the *Top*, and they become Hollow, they put forth the more. Wee adde alſo, that it is delivered for certaine by ſome, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* have little or no *Coares*, and *Stones*.

Experiment Solitary, touching the *Meliioration* of *Tobacco*. 855

Tobacco is a thing of great Price, if it be in requeſt. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwiſe, is great, but nothing to the Profit. But the *Engliſh Tobacco*, hath ſmall credit, as being too *Dull*, and *Earthy*: Nay the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the ſame *Cauſe*: So that a Triall

a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, where a Thing of great profit. Some have gone about to doe it by Drenching the *English Tobacco*, in a *Decoction* or *Infusion* of *Indian Tobacco:* But those are but Sophistications, and Toyes; For Nothing that is once Perfect, and hath run his Race, can receive much Amendment. You must ever resort to the Beginnings of Things for *Melioration*. The Way of *Maturation* of *Tobacco* must, as in other *Plants*, be, from the *Heat*, Either of the *Earth*, or of the *Sunne:* We see some Leading of this in Musk-Melons; which are sowen upon a *Hot Bed*, Dunged below, upon a Banke turned upon the *South Sunne*, to give *Heat* by *Reflexion*; Laid upon *Tiles*, which increaseth the *Heat*; And Covered with *Straw* to keepe them from *Cold*. They remove them also, which addeth some *Life:* And by these Helps they become as good in *England*, as in *Italy*, or *Provence*. These, and the like Meanes, may be tried in *Tobacco*. Enquire also of the *Steeping* of the *Roots*, in some such *Liquour*, as may give them Vigour to put forth Strong.

Experiment Solitary, touching severall *Heats*, working the same *Effects*. 856

Heat of the *Sunne*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vivification* of *Living Creatures*; are both represented and supplyed, by the *Heat* of *Fire*; And likewise, the *Heats* of the *Sunne*, and *Life*, are represented one by the other. *Trees*, set upon the *Backs* of *Chimneyes*, doe ripen *Fruit* sooner. *Vines*, that have beene drawne in at the Window of a *Kitchen*, have sent forth *Grapes* ripe a Moneth (at least) before others. *Stoves*, at the Backe of Walls, bring forth *Orenges* here with us. *Egges*, as is reported by some, have beene hatched in the warmth of an *Oven*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egges* under *Sand*, where the *Heat* of the *Sunne* discloseth them.

Experiment Solitary, touching *Swelling* and *Dilatation* in *Boyling*. 857

Barley in the *Boyling* swelleth not much; *Wheat* swelleth more; *Rize* extremely; In so much as a Quarter of a Pint (unboyled) will arise to a Pint boyled. The *Cause* (no doubt) is, for that the more Close and Compact the *Body* is, the more it will dilate: Now *Barley* is the most Hollow; *Wheat* more Solide than that; and *Rize* most Solide of all. It may be also that some *Bodies* have a Kinde of *Lentour*, and more *Dispertible Nature* than others; As we see it Evident in *Colouration*; For a Small *Quantitie* of *Saffron*, will Tinct more, than a verie great *Quantitie* of *Bresill*, or *Wine*.

Experiment Solitary, touching the *Dulceration* of *Fruits*. 858

Fruit groweth *Sweet* by *Rowling*, or *Pressing* them gently with the *Hand*; As *Rowling-Peares*, *Damasins*, &c. By *Rottennesse*; As *Medlars*, *Services*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine Speciall *Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*: As in *Roasting*, *Stewing*, *Baking*, &c. The *Cause* of the *Sweetnesse* by *Rowling*, and *Pressing*, is *Emollition*, which they properly enduce; As in Beating of *Stock-Fish*, *Flesh*, &c. By *Rottennesse* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby disgest the

the Harder Part: For in all *Putrefactions*, there is a *Degree* of *Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe ever feed upon the *Tangible Parts*, and attenuate them. By Severall *Maturations* is, by some *Degree* of *Heat*. And by *Fire* is, because it is the Proper Worke of *Heat* to Refine, and to Incorporate; And all *Soureneſſe* consisteth in some *Grosseneſſe* of the *Body:* And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which ever inducеth a Milder *Taste*.

Experiment Solitary, touching *Fish Edible*, and not *Edible*. 859

OF *Fleshes*, some are *Edible*; Some, except it be in *Famine*, not. For those that are not *Edible*, the *Cause* is, for that they have (commonly) too much *Bitterneſſe* of *Taste*; And therefore those *Creatures*, which are Fierce and Cholerick, are not *Edible*; As *Lions*, *Wolves*, *Squirrells*, *Dogs*, *Foxes*, *Horses*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We see they are *Milde* and *Fearfull*. Yet it is true, that *Horses*, which are *Beasts* of Courage, have beene, and are eaten by some *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineses* eat *Horse-flesh* at this day; And some *Gluttons* have used to haue *Colts-flesh* baked. In *Birds*, such as are *Carnivoræ*, and *Birds* of *Prey*, are commonly no Good *Meat*; But the Reason is, rather the *Cholerick Nature* of those *Birds*, than their *Feeding* upon *Flesh*; For *Puits*, *Gulls*, *Shovelers*, *Ducks*, doe feed upon *Flesh*, and yet are good *Meat:* And wee see, that those *Birds*, which are of *Prey*, or feed upon *Flesh*, are good *Meat*, when they are verie Young; As *Hawkes*, *Rookes* out of the Nest, *Owles*, &c. *Mans Flesh* is not Eaten. The Reasons are Three: First, because *Men* in *Humanitie* doe abhorre it: Secondly, because no *Living Creature*, that *Dyeth* of *it selfe*, is good to Eat: And therefore the *Caniballs* (themselves) eat no *Mans-flesh*, of those that *Dye* of *Themselves*, but of such as are *Slaine*. The Third is, because there must be (generally) some *Disparitie*, between the *Nourishment*, and the *Body Nourished*; And they must not be Over-neere, or like: yet we see, that in great *Weaknesses*, and *Consumptions*, *Men* have beene sustained with *Womans Milke:* And *Ficinus* fondly (as I conceive) adviseth, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *Witches* doe greedily eat *Mans flesh*; which if it be true, besides a *Divellish Appetite* in them, it is likely to proceed, for that *Mans flesh* may send up High and Pleasing *Vapours*, which may stirre the *Imagination*; And *Witches* Felicitie is chiefly in *Imagination*, as hath beene said.

Experiment Solitary, touching the *Salamander*. 860

THere is an Ancient Received *Tradition* of the *Salamander*, that it liveth in the *Fire*, and hath force also to extinguish the *Fire*. It must have two Things, if it be true, to this *Operation:* The One a verie *Close skin*, whereby *Flame*, which in the Midst is not so hot, cannot enter: For we see that if the *Palme* of the *Hand* be annointed thicke with *White* of *Egge*, and then *Aquavitæ* be poured upon it, and *Enflamed*, yet one may endure the *Flame* a prettie while. The other is some *Extreme Cold* and

Quenching vertue, in the *Body* of that *Creature*, which choaketh the *Fire*. We see that *Milke* quencheth *wilde-Fire*, better than *Water*, because it entreth better.

Experiment Solitary, touching the *Contrarie Operations* of *Time*, upon *Fruits*, and *Liquours*. 861

Time doth change *Fruit*, (as *Apples*, *Peares*, *Pomgranats*, &c) from more *Soure*, to more *Sweet*: But contrariwise *Liquours*, (even those that are of the *Iuyce* of *Fruit*,) from more *Sweet* to more *Soure*; As *Wort*, *Must*, *New Verjuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both Kindes, the *Spirit* is attenuated by *Time*; But in the first Kinde, it is more *Diffused*, and more *Mastered* by the *Grosser Parts*, which the *Spirits* doe but disgest: But in *Drinkes* the *Spirits* doe reigne, and finding lesse Opposition of the *Parts*, become themselves more *Strong*; Which causeth also more Strength in the *Liquour*; Such, as if the *Spirits* be of the Hotter Sort, the *Liquour* becommeth apt to *Burne*; But in Time, it causeth likewise, when the Higher *Spirits* are Evapourated, more *Sourenesse*.

Experiment Solitary, touching *Blowes* and *Bruises*. 862

IT hath beene observed by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath onely a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters* and *Ointments* doe enter. Surely, the *Cause*, that *Blowes* and *Bruises* enduce *Swellings* is, for that the *Spirits* resorting to Succour the *Part* that Laboureth, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment Solitary, touching the *Orris Root*. 863

THe *Nature* of the *Orris Root*, is almost Singular; For there be few *Odoriferous Roots*; And in those that are, in any degree, *Swet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to have a Tender daintie *Heat*; Which when it commeth above Ground, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a Smell like a *Violet*.

Experiment Solitary, touching the *Compression* of *Liquours*. 864

IT hath been observed by the *Ancients*, that a great *Vessell* full, drawne into *Bottles*; And then the *Liquour* put againe into the *Vessell*; will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquour*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may be Triviall; Namely, by the *Expence* of the *Liquour*, in regard some may sticke to the Sides of the *Bottles*: But there may be a *Cause* more Subtill; Which is, that the *Liquour* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquour* meeteth with *Liquour* chiefly; But in the *Bottles* a Small Quantitie of *Liquour*, meeteth

teth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open againe.

Experiment Solitary, touching the *Working* of *Water* upon *Aire Contiguous*. 865

WAter, being contiguous with *Aire*, Cooleth it, but Moistneth it not, except it *Vapour*. The *Cause* is, for that *Heat* and *Cold* have a *Virtuall Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such severall Levitie, and Gravitie, as they Mingle not, there can follow no *Imbibition*. And therefore, *Oyle* likewise lyeth at the *Top* of the *Water*, without Commixture: And a *Drop* of *Water*, running swiftly over a *Straw*, or *Smooth Body*, wetteth not.

Experiment Solitary, touching the *Nature* of *Aire*. 866

STarre-light *Nights*, yea and bright *Moone-shine Nights*, are *Colder* than *Cloudy Nights*. The *Cause* is, the *Drinesse* and *Finenesse* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharp*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is dry. Also *Close Aire* is warmer than *Open Aire*; which (it may be) is, for that the true *Cause* of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And againe, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some Secret *Degree* of *Heat*: As it is not likewise without some Secret *Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

Experiments in Consort touching the *Eyes*, and *Sight*. 867

THe *Eyes* doe move one and the same way; For when one *Eye* moveth to the *Nosthrill*, the other moveth from the *Nosthrill*. The *Cause* is *Motion* of *Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Use* will induce the Contrarie: For some can *Squint*, when they will: And the Common *Tradition* is, that if *Children* be set upon a Table, with a Candle behinde them, both *Eyes* will move Outwards; As affecting to see the *Light*, and so induce *Squinting*.

868 Wee see more exquisitely with *One Eye Shut*, than with *Both Open*: The *Cause* is, for that the *Spirites Visuall* unite themselves more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth.

869 The *Eyes*, if the *Sight* meet not in one *Angle*, *See Things Double*. The *Cause* is, for that *Seeing* two Things, and *Seeing* one Thing twice, worketh the same *Effect*: And therefore a little *Pellet*, held betweene two *Fingers*, laid a crosse, seemeth *Double*.

870 *Pore-blinde Men*, see best in the *Dimmer Light*; And likewise have their *Sight* Stronger neere hand, than those that are not *Pore-blinde*. And can Reade and Write smaller *Letters*. The *Cause* is, for that the *Spirites Visuall*, in those that are *Pore-blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* disperseth them. For the same

Cause they need Contracting; But being *Contracted*, are more strong, than the *Visuall Spirits* of Ordinarie *Eyes* are; As when we see thorow a *Levell*, the *Sight* is the Stonger: And so is it, when you gather the *Eye-lids* somewhat close: And it is commonly seene in those that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to Read, put the Paper somewhat a farre off. The *Cause* is, for that *Old Mens Spirits Visuall*, contrarie to those of *Pore-blinde Men*, unite not, but when the *Object* is at some good distance, from their *Eyes*.

871 *Men* see better, when their *Eyes* are over-against the *Sunne*, or a *Candle*, if thy put their *Hand* a little before their *Eye*. The *Reason* is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfused* is enough for the *Perception*. For wee see, that an *Over-light* maketh the *Eyes* Dazell; Insomuch as Perpetuall Looking against the *Sunne*, would Cause *Blindnesse*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwise, if they come out of a *Darke Roome*, into a *Light Roome*, they seeme to have a *Mist* before their *Eyes*, and see worse, than they shall doe, after they have stayed a little while, either in the *Light*, or in the *Darke*. The *Cause* is, for that the *Spirits Visuall*, are upon a Sudden Change, disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot *Contract* suddenly; And when they are much *Contracted* by *Darknesse*, they cannot *Dilate* suddenly. And Excesse of both these, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*,) if it be long, Destroyeth the *Eye*. For as long Looking against the *Sunne*, or *Fire*, hurteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872 It hath beene observed, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The *Cause* is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seene in the *Eyes*, because they are Transluciде; Though withall it maketh both the *Cheekes*, and the *Gills Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*; for that the *Eyes*, in Shame doe put backe the *Spirits*, that ascend to them, as unwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Dejectedly; And that *Repulsion* from the *Eyes*, Divertеth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873 The *Objects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*, Except it be by *Memory*, as hath beene said. The *Glimpses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that have glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautifull Person*; And the like; doe delight and exhilarate the *Spirits* much. The *Reason*,

Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is the most *Spirituall* of the *Senses*; whereby it hath no *Object* Grosse enough to offend it. But the *Cause* (chiefly) is, for that there be no *Active Objects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smels*, and *Stinks*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore have little or no *Activitie*. Somewhat they doe Contristate, but verie little.

WAter of the *Sea*, or otherwise, looketh *Blacker* when it is moved, and *Whiter* when it resteth. The *Cause* is, for that by meanes of the *Motion*, the *Beames* of light passe not Straight, and therefore must be darkened; whereas, when it resteth, the *Beames* doe passe Straight. Besides, *Splendour* hath a *Degree* of *Whiteneſſe*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Speele* behinde, looketh *Whiter*, than *Glasse Simple*. This *Experiment* deserveth to be driven further, in Trying by what Meanes *Motion* may hinder *Sight*.

Experiment Solitary, touching the *Colour* of the *Sea*, or other *Water*.
874

SHell-*Fish* have beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they have *Male*, and *Female*, as other *Fish* have: Neither are they bred of *Putrefaction*; Especially such as doe Move. Nevertheless it is certaine, that *Oisters*, and *Cockles*, and *Muscles*, which Move not, have not discriminate *Sex*: *Quære* in what time, and how they are bred? It seemeth that *Shells* of *Oisters* are bred where none were before; And it is tried, that the great *Horse-Muscle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirtie yeares: But then, which is strange, it hath been tried, that they doe not only Gape, and Shut, as the *Oisters* doe, but Remove from one Place to Another.

Experiment Solitary, touching *Shell-Fish*.
875

THe *Senses* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are Stronger. The *Cause* may be, for that the *Braine*, which is the *Instrument* of *Sense*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Moving*, are somewhat holpen from the *Liver*, which lieth on the *Right Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides*, from the Time of our Birth; But the *Limmes* are used most on the *Right Side*, whereby *Custome* helpeth; For we see that some are *Left-Handed*: Which are such, as have used the *Left-Hand* most.

Experiment Solitary, touching the *Right Side*, and the *Left*.
876

FRictions make the *Parts* more *Fleshie*, and *Full*: As wee see both in *Men*; And in *Currying* of *Horses*, &c. The *Cause* is, for that they draw greater *Quantitie* of *Spirits* and *Bloud* to the *Parts*: And againe, because they draw the *Aliment* more forcibly from within: And againe, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *Bloud*, and *Aliment*: Lastly, because they dissipate and disgest any *Inutile* or *Excrementitious*

Experiment Solitary touching *Frictions*.
877

Crementitious Moisture, which lieth in the *Flesh*: All which help *Assimilation*. *Frictions* also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The *Cause* is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we have noted heretofore,) *Gally-Slaves* are *Fat* and *Fleshie*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment Solitary touching *Globes* appearing *Flat* at *Distance*. 878

ALL *Globes* afarre off appeare *Flat*. The *Cause* is, for that *Distance*, being a *Secundarie Object of Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparitie* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Dunkish Paper*. And all *Engravings*, and *Embossings*, (afarre off) appeare *Plaine*.

Experiment Solitary, touching *Shadowes*. 879

THe *Vtmost Parts* of *Shadowes* seeme ever to *Tremble*. The *Cause* is, for that the little *Moats*, which we see in the *Sunne*, doe ever-Stirre, though there be no *Wind*; And therefore those Moving, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to Move, because the *Medium* Moveth.

Experiment Solitary, touching the *Rowling* and *Breaking* of the *Seas*. 880

SHallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantitie* of *Water*, and likewise *Space* Enough; there the *Water* Rowleth, and Moveth both more Slowly, & with a Sloper Rise, and Fall: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the Bottome; there it moveth more Swiftly, and more in *Precipice*; For in the *Breaking* of the *Waves* there is ever a *Precipice*.

Experiment Solitary, touching the *Dulcoration* of *Salt-Water*. 881

IT hath beene observed by the *Ancients*, that *Salt-water Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it selfe *Raw*: And yet the *Taste* of *Salt*, in *Distillations* by *Fire*, riseth not; For the *Distilled Water* will be *Fresh*. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottome*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For Simple *Distilled Waters*, of *Wormewood*, and the like, are not Bitter.

Experiment Solitary, touching the Reason of Saltnesse in the Sea-Shore. 882

IT hath beene set downe before, that *Pits* upon the *Sea-Shoare*, turne into *Fresh Waters*, by *Percolation* of the *Salt* through the *Sand*. But it is further noted, by some of the *Ancients*, that in some Places of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The *Cause* is, for that after a time, the verie *Sands*, thorow which the *Salt-Water* falleth, become *Salt*: And so the *Strainer* it selfe is tincted with *Salt*.

Salt. The Remedie therefore is, to digge still *New Pits*, when the old wax *Brackish*; As if you would change your *Strainer*.

Experiment Solitary, touching *Attraction* by *Similitude* of *Substance* 883

IT hath beene observed by the *Ancients*, that *Salt-water*, will dissolve *Salt* put into it, in lesse time, than *Fresh water* will dissolve it. The *Cause* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Substance*, draw the *Salt* new put in, unto it; Whereby it diffuseth in the *Liquour* more speedily. This is a Noble *Experiment*, if it be true; For it sheweth Meanes of more Quick and Easie *Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude* of *Substance*. Trie it with *Sugar* put into *Water* formerly *Sugred*; And into other *Water Vnsugred*.

Experiment Solitary, touching *Attraction*. 884

PUt *Sugar* into *Wine*, part of it above, part under the *Wine*; And you shal finde, (that which may seem strange,) that the *Sugar* above the *Wine*, will soften and dissolve sooner, than that within the *Wine*. The *Cause* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is under the *Wine*, by Simple *Infusion*, or *Spreading*; But that *Part* above the *Wine*, is likewise forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquour*, if it be Contiguous: As wee see it also in *Spunges*, put part above the *Water*. It is worthy the Inquirie, to see how you may make more *Accurate Infusions*, by Help of *Attraction*.

Experiment Solitary, touching *Heat* under *Earth*. 885

WAter in *Wells* is *warmer* in *Winter*, than in *Summer*: And so *Aire* in *Caves*. The *Cause* is, for that in the Hither *Parts*, under the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which shut close in, (as in *Winter*,) is the More; But if it Perspire, (as it doth in *Summer*,) it is the lesse.

Experiment Solitary, touching *Flying* in the *Aire*. 886

IT is reported, that amongst the *Leucadians*, in *Ancient* time, upon a Superstition, they did use to Precipitate a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with Strings, at some distance, many great *Fowles*; And fixing unto his *Body* divers *Feathers*, spred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare up a good *Weight*, as they flie; And *Spreading* of *Feathers*, thinne, and close, and in great Bredth, will likewise beare up a great *Weight*; Being even laid, without Tilting upon the Sides. The further *Extension* of this *Experiment* for *Flying* may be thought upon.

Experiment Solitary, touching the *Dye* of *Scarlet*. 887

THere is, in some Places, (namely in *Cephalonia*,) a little *Shrub*, which thay call *Holy-Oake*, or *Dwarf-Oake*: Upon the *Leaves* whereof there riseth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certaine *Red Dust*, that converteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to Quicken: With this *Dust* they die *Scarlet*.

Experiment Solitary tou-

IN *Zant*, it is verie ordinarie, to make *Men Impotent*, to accompany with

ching *Maleficiating.*
888

with their *wives.* The like is Practiſed in *Gaſconie*; Where it is called *Nouer l'eguillette.* It is practiſed alwayes upon the *wedding Day.* And in *Zant*, the Mothers themſelves doe it, by way of Prevention; Becauſe thereby they hinder other *Charmes*, and can undoe their Owne. It is a Thing the *Civill Law* taketh knowledge of; And therefore is of no Light Regard.

Experiment Solitary, touching the *Riſe of Water*, by *Meanes* of *Flame.*
889

IT is a Common *Experiment*, but the *Cauſe* is miſtaken. Take a *Pot*, (Or better a *Glaſſe*, becauſe therein you may ſee the *Motion*,) And ſet a *Candle* lighted in the *Bottome* of a *Baſon* of *Water*; And turne the *Mouth* of the *Pot*, or *Glaſſe*, over the *Candle*, & it will make the *Water* riſe. They aſcribe it, to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as ſoone as it is covered, being ſuffocated by the *Cloſe Aire*, leſſeneth by little and little: During which time, there is ſome little Aſcent of *Water*, but not much: For the *Flame* Occupying leſſe and leſſe Roome, as it leſſeneth, the *Water* ſucceedeth. But upon the *Inſtant* of the *Candles Going out*, there is a ſudden *Riſe*, of a great deale of *Water*; For that the *Body* of the *Flame* filleth no more Place; And ſo the *Aire*, and the *Water* ſucceed. It worketh the ſame *Effect*, if in ſtead of *Water*, you put *Flower*, or *Sand*, into the *Baſon*: Which ſheweth, that it is not the *Flames* Drawing the *Liquour*, as *Nouriſhment*; As it is ſuppoſed; For all *Bodies* are alike unto it; As it is ever in *Motion* of *Nexe*; Inſomuch as I have ſeene the *Glaſſe*, being held by the Hand, hath lifted up the *Baſon*, and all: The *Motion* of *Nexe* did ſo Claſp the *Bottome* of the *Baſon*. That *Experiment*, when the *Baſon* was lifted up, was made with *Oyle*, and not with *Water*: Nevertheleſſe this is true, that at the verie firſt *Setting* of the *Mouth* of the *Glaſſe*, upon the *Bottome* of the *Baſon*, it draweth up the *Water* a little, and then ſtandeth at a Stay, almoſt till the *Candles Going out*, as was ſaid. This may ſhew ſome *Attraction* at firſt: But of this we will ſpeake more, when we handle *Attractions* by *Heat.*

Experiments in Conſort touching the *Influences* of the *Moone.*

Of the *Power* of the *Celeſtiall Bodies*, and what more Secret *Influences* they have, beſides the two Manifeſt *Influences* of *Heat* and *Light*, We ſhall ſpeake, when we handle *Experiments* touching the *Celeſtiall Bodies*: Meane-while, wee will give ſome Directions for more certaine *Trials*, of the *Vertue* and *Influences* of the *Moone*; which is our *Neereſt Neighbour.*

The *Influences* of the *Moone*, (moſt obſerved,) are Foure. The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: The *Increaſe* of *Moiſture*: The *Exciting* of the *Motions* of *Spirits.*

For

890 For the *Drawing forth* of *Heat*, wee have formerly preſcribed, to take *Water Warme*, and to ſet Part of it againſt the *Moone-Beames*, and Part of it with a *Skreene* between; And to ſee whether that which ſtandeth Expoſed to the *Beames*, will not *Coole* ſooner. But becauſe this is but a Small *Interpoſition*, (though in the *Sunne* wee ſee a Small *Shade* doth much,) it were good to trie it, when the *Moone* ſhineth, and when the *Moone* ſhineth not at all; And with *Water Warme* in a *Glaſſe-Bottle*, aſwell as in a *Diſh*; And with *Cinders*; And with *Iron Red-Hot*; &c.

891 For the *Inducing* of *Putrefaction*, it were good to trie it with *Fleſh*, or *Fiſh*, Expoſed to the *Moone-Beames*; And againe Expoſed to the *Aire*, when the *Moone* ſhineth not, for the like time; To ſee whether will corrupt ſooner: And trie it alſo with *Capon*, or ſome other *Fowle*, laid abroad, to ſee whether it will mortifie, and become tender ſooner? Trie it alſo with Dead *Flies*, or Dead *Wormes*, having a little *Water* caſt upon them, to ſee whether will *Putrifie* ſooner. Trie it alſo with an *Apple*, or *Orenge*, having *Holes* made in their *Tops*, to ſee whether will Rot or Mould ſooner? Trie it alſo with *Holland-Cheeſe*, having *Wine* put into it, whether will breed *Mites* ſooner, or greater?

892 For the *Increaſe* of *Moiſture*, the Opinion Received is; That *Seeds* will grow ſooneſt; And *Haire*, and *Nailes*, and *Hedges*, and *Herbs*, Cut, &c. will grow ſooneſt, if they be Set, or Cut, in the *Increaſe* of the *Moone*. Alſo that *Braines* in *Rabits*, *Wood-cocks*, *Calves*, &c. are fulleſt in the *Full* of the *Moone*: And ſo of *Marrow* in the *Bones*; And ſo of *Oyſters*, and *Cockles*, which of all the reſt are the eaſieſt tried, if you have them in *Pits.*

893 Take ſome *Seeds*, or *Roots*, (as *Onions*, &c.) and ſet ſome of them immediately after the *Change*; And others of the ſame kinde immediately after the *Full*: Let them be as Like as can be: The *Earth* alſo the Same as neere as may be; And therefore beſt in *Pots*: Let the *Pots* alſo ſtand, where no *Raine*, or *Sunne* may come to them, leſt the *Difference* of the *Weather* confound the *Experiment*: And then ſee in what Time, the *Seeds Set* in the *Increaſe* of the *Moone*, come to a certaine Height; And how they differ from thoſe that are *Set* in the *Decreaſe* of the *Moone.*

894 It is like, that the *Braine* of *Man* waxeth *Moiſter*, and *Fuller*, upon the *Full* of the *Moone*: And therefore it were good for thoſe that have *Moiſt Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloes*, *Roſe-Mary*, *Frankincenſe*, &c. about the full of the *Moone*. It is like alſo, that the *Humours* in *Mens Bodies*, Increaſe, and Decreaſe, as the *Moone* doth; And therefore it were good to Purge, ſome day, or two, after the *Full*; For that then the *Humours* will not repleniſh ſo ſoone againe.

895 As for the *Exciting* of the *Motion* of the *Spirits*, you muſt note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is cauſed from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increaſe* of the *Moiſture*. But for *Spirits* in particular, the great *Inſtance* is in *Lunacies.*

896 There may be other Secret *Effects* of the *Influence* of the *Moone*, which are not yet brought into *Obſervation*. It may be, that if it ſo fall

out,

out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South West*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be observed.

897 It may be, that *Children*, and *Young Cattell*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, & larger, than those that are brought forth in the *Wane*: And those also which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandrie*, to put *Rams*, and *Bulls* to their *Females*, somewhat before the *Full* of the *Moone*. It may be also, that the *Egs* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Observation*: *Quære* also, whether great *Thunders*, and *Earth Quakes*, be not most in the *Full* of the *Moone*.

Experiment Solitary, touching *Vinegar*. 898 THe *Turning* of *Wine* to *Vinegar*, is a Kinde of *Putrefaction*: And in *Making* of *Vinegar*, they use to set *Vessels* of *Wine* over against the *Noone-Sunne*; which calleth out the more *Spirituous Spirits*, and leaveth the *Liquour* more *Soure*, and *Hard*. Wee see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Unburnt*. It is said that *Cider* in *Navigations* under the *Line* ripeneth, when *Wine* or *Beere* sowreth. It were good to set a *Rundlet* of *Verjuyce* over against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will Ripen, and Sweeten.

Experiment Solitary, touching *Creatures* that *Sleepe* all *Winter*. 899 THere be divers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hog*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *want* of *Assimilating*; For whatsoever *Assimilateth* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping Time*, have beene observed not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remove*. And they get *Warme* and *Close places* to *Sleepe* in. When the *Flemmings* Wintred in *Nova Zembla*, the *Beares*, about the Middle of *November*, went to *Sleepe*; And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Beare* breedeth, and lyeth in with her Young, during that time of *Rest*: And that a *Beare*, *Big* with *Young*, hath seldome beene seene.

Experiment Solitary, touching the *Generation* of *Creatures* by *Copulating*, and by *Putrefaction*. 900 SOme *Living Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (nevertheless) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Vivification*, is a *Gentle* and *Proportionable Heat*, working upon a *Glutinous* and *Yeelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Yeelding*, is driven forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*.

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Therefore all *Sperme*, all *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, have evermore a *Closeness*, *Lentour*, and *Sequacitie*. It seemeth therefore, that the *Generation* by *Sperme only*, and by *Putrefaction*, have two Different *Causes*. The first is, for that *Creatures*, which have a *Definite* and *Exact Shape*, (as those have which are Procreated by *Copulation*,) cannot be produced by a *Weake*, and *Casuall Heat*; Nor out of *Matter*, which is not *exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vivification* be of any length, then the *Spirit* will Exhale, before the *Creature* be *Mature*: Except it be Enclosed in a *Place* where it may have *Continuance* of the *Heat*, *Accesse* of some *Nourishment* to maintaine it, and *Closeness* that may keepe it from *Exhaling*. And such *Places* are the *Wombs*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Uncertaine Shape*; And are made in *Shorter Time*; And need not so Perfect an *Enclosure*, though some *Closeness* be commonly required. As for the *Heathen Opinion*, which was, that upon great *Mutations* of the *World*, *Perfect Creatures* were first Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and such like, are now; Wee know it to be vaine: But if any such Thing should be admitted, Discoursing according to *Sense*, it cannot be, except you admit of a *Chaos* first, and *Commixture* of *Heauen* and *Earth*. For the *Frame* of the *World* once in Order, cannot effect it by any *Excesse*, or *Casualtie*.

NATVRALL HISTORIE.

X. Century.

THe *Philosophie* of *Pythagoras*, (which was full of *Superstition*,) did first plant a *Monstrous Imagination*, Which afterwards was, by the *Schoole* of *Plato*, and Others, Watred, and Nourished: It was, that the *World* was *One*, *Entire*, *Perfect*, *Living Creature*; Insomuch as *Apollonius* of *Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing* and *Flowing* of the *Sea*, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Living Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deitie* besides;) But only

Experiments in Consort touching the *Transmission*, and *influx*, of *Immateriate Vertues*, and the *Force of Imagination*.

only the *Soule*, or *Essentiall Forme* of the *Universe*. This *Foundation* being laid, they mought build upon it, what they would; For in a *Living Creature*, though never so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of any one *Part* of the *Body*, instantly make a *Transcursion* thorowout the whole *Body*: So that by this they did insinuate, that no *Distance* of *Place*, nor *Want* or *Indisposition* of *Matter*, could hinder *Magicall Operations*; But that, (for Example,) wee mought here in *Europe*, have *Sense* and *Feeling* of that, which was done in *China*: And likewise, we mought worke any *Effect*, *without*, and *against Matter*: And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but only by the *Vnitie* and *Harmonie* of *Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit* of *Man*, (whom they call the *Microcosme*,) doe give a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelsus*, and some darksom *Authors* of *Magicke*, doe ascribe to *Imagination Exalted*, the *Power* of *Miracle-working Faith*. With these Vast and Bottomelesse *Follies*, *Men* have been (in part) entertained.

But wee, that hold firme to the *Works* of *God*; And to the *Sense*, which is *Gods Lamp*; (*Lucerna Dei Spiraculum Hominis*;) will enquire, with all Sobrietie, and Severitie, whether there be to be found, in the Foot-steps of *Nature*, any such *Transmission* and *Influx* of *Immateriate Vertues*; And what the *Force* of *Imagination* is; Either upon the *Body Imaginant*, or upon another *Body*: Wherein it will be like that *Labour* of *Hercules*, in Purging the *Stable* of *Augeas*, to separate from *Superstitious*, and *Magicall Arts*, and *Observations*, any thing that is cleane, and pure *Naturall*; And not to be either Contemned, or Condemned. And although wee shall have occasion to speake of this in more Places than One, yet we will now make some Entrance thereinto.

Experiments in Consort, touching *Transmission* of Spirits, and the *Force* of Imagination.

MEn are to be Admonished, that they doe not with-draw Credit, from the *Operations* by *Transmission* of *Spirits*, & *Force* of *Imagination*, because the *Effects* faile sometimes. For as in *Infection*, and *Contagion* from *Body* to *Body*, (as the *Plague*, and the like,) it is most certaine, that the

901

the *Infection* is received (many times) by the *Body Passive*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it formed into a *Disease*; So much more in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is Encountred, and Overcome, by the *Minde* and *Spirit*, which is *Passive*, before it worke any manifest *Effect*. And therefore, they worke most upon *Weake Mindes*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious*, and *Fearfull Persons*; *Children*, and *Young Creatures*;

Nescio quis teneros Oculus mihi fascinat Agnos:

The *Poet* speaketh not of *Sheepe*, but of *Lambs*. As for the *Weakenesse* of the *Power* of them, upon *Kings*, and *Magistrates*; It may be ascribed, (besides the maine, which is the *Protection* of *God*, over those that Execute his Place,) to the *Weakenesse* of the *Imagination* of the *Imaginant*: For it is hard, for a *Witch*, or a *Sorcerer*, to put on a Beleefe, that they can hurt such *Persons*.

902 *Men* are to be Admonished, on the other side, that they doe not easily give Place and Credit to these *Operations*, because they *Succeed many times*; For the *Cause* of this *Successe*, is (oft) to be truly ascribed, unto the *Force* of *Affection* and *Imagination*, upon the *Body Agent*; And then by a *Secondarie Meanes*, it may worke upon a *Divers Body*: As for Example; If a *Man* carrie a *Planets Seale*, or a *Ring*, or some *Part* of a *Beast*, beleeving strongly, that it will help him to obtaine his *Love*; Or to keepe him from danger of hurt in *Fight*; Or to prevaile in a *Suit*; &c. it may make him more *Active*, and *Industrious*; And againe, more *Confident*, and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industrie*, and *Perseverance*, (especially in *Civill Businesse*,) who knoweth not? For wee see *Audacitie* doth almost binde and mate the *weaker Sort* of *Minds*; And the *State* of *Humane Actions* is so variable, that to trie Things oft, and never to give over, doth Wonders: Therefore, it were a Meere *Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, upon another *Body*, which is but the *Force* of *Imagination* upon the Proper *Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly upon the *Body* of the *Imaginant*: As wee shall shew in due place.

903 *Men* are to be Admonished, that as they are not to mistake the *Causes* of these *Operations*; So, much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as divers wise *Iudges* have prescribed, and cautioned, *Men* may not too rashly beleeve, the *Confessions* of *Witches*, nor yet the *Evidence* against them. For the *Witches* themselves are *Imaginative*, and beleeve oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-Craft*. It is worthy the Observing, that both in *Ancient*, and *Late times*; (As in the *Thessalian Witches*, and the Meetings of *Witches* that have beene recorded by so many late *Confessions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselves into

other *Bodies*; &c. are ſtill reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Annointing* themſelves all over. This may juſtly move a *Man* to thinke, that theſe *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke,) by *Stopping* of the *Pores*, ſhut in the *Vapours*, and ſend them to the *Head* extremely. And for the Particular *Ingreaients* of thoſe *Magicall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annointing* of the *Fore-head*, *Necke*, *Feet*, *Back-Bone*; we know is uſed for Procuring *Dead Sleepes*: And if any *Man* ſay, that this *Effect* would be better done by Inward *Potions*; Anſwer may be made, that the *Medicines*, which goe to the *Ointments*, are ſo ſtrong, that if they were uſed inwards, they would kill thoſe that uſe them: And therefore they worke Potently, though Outwards.

We will divide the Severall Kindes of the *Operations*, by *Tranſmiſſion* of *Spirits*, and *Imagination*; Which will give no ſmall Light to the *Experiments* that follow. All *Operations* by *Tranſmiſſion* of *Spirits*, and *Imagination* have this; That they *Worke* at *Diſtance*, and not at *Touch*; And they are theſe being diſtinguiſhed.

904 The Firſt is the *Tranſmiſſion* or *Emiſſion*, of the *Thinner*, and more *Aiery Part* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the reſt, the moſt *Corporeall*. But you muſt remember withall, that there be a Number of thoſe *Emiſſions*, both *wholeſome*, and *Vnwholſome*, that give no *Smell* at all: For the *Plague*, many times, when it is taken, giveth no *Scent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other Prooфes, that differ not in *Smell* from other *Aires*. And under this Head, you may place all *Imbibitions* of *Aire*, where the *Subſtance* is *Materiall*, *Odour-like*; Whereof ſome nevertheleſſe are ſtrange, and verie ſuddenly diffuſed; As the *Alteration*, which the *Aire* receiveth in *Ægypt*, almoſt immediately, upon the *Riſing* of the *River* of *Nilus*, whereof we have ſpoken.

905 The Second is the *Tranſmiſſion* or *Emiſſion* of thoſe *Things* that wee call *Spirituall Species*; As *Viſibles*, and *Sounds*: The one whereof wee have handled; And the other we ſhall handle in due place. Theſe move ſwiftly, and at great diſtance; But then they require a *Medium* well diſpoſed; And their *Tranſmiſſion* is eaſily ſtopped.

906 The Third is the *Emiſſions*, which cauſe *Attraction* of *Certaine Bodies* at *Diſtance*; Wherein though the *Loadſtone* be commonly placed in the Firſt Ranke, yet we thinke good to except it, and referre it to another *Head*: but the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at diſtance; And the *Attraction* of *Heat* at diſtance; And that of *Fire* to *Naphtha*; And that of ſome *Herbs* to *Water*, though at diſtance; And divers others; We ſhall handle, but yet not under this preſent *Title*, but under the *Title* of *Attraction* in generall. The

907 The Fourth is the *Emiſſion* of *Spirits*, and *Immateriate Powers* and *Vertues*, in thoſe Things, which worke by the *Vniverſall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celeſtiall Influxes*, (as is vainly taught and received,) but by the *Primitive Nature* of *Matter*, and the *Seeds* of *Things*. Of this kinde is, (as we yet ſuppoſe,) the *Working* of the *Load-Stone*, which is by *Conſent* with the *Globe* of the *Earth*: Of it is Kinde i the *Motion* of *Gravitie*, which is by *Conſent* of *Denſe Bodies*, with the *Globe* of the *Earth*: Of this kinde is ſome *Diſpoſition* of *Bodies* to *Rotation*, and particularly from *Eaſt* to *Weſt*: Of which kinde we conceive the *Maine Float* and *Re-float* of the *Seas*, which is by *Conſent* of the *Vniverſe*, as Part of the *Diurnall Motion*. Theſe *Immateriate Vertues* have this Properтie differing from Others; That the *Diverſitie* of the *Medium* hindreth them not; But they paſſe through all *Mediums*; yet at *Determinate Diſtances*. And of theſe wee ſhall ſpeake, as they are incident to ſeverall *Titles*.

908 The Fifth is the *Emiſſions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, upon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be Vehement; And the *Operation* of the *Imagination*, if it be Strong. But theſe two are ſo *Coupled*, as wee ſhall handle them together: For when an *Envious*, or *Amorous Aſpect*, doth infect the *Spirits* of Another, there is Joyned both *Affection*, and *Imagination*.

909 The Sixth is, the Influxes of the *Heavenly Bodies*, beſides thoſe two Manifeſt Ones, of *Heat*, and *Light*. But theſe we will handle, where we handle the *Celeſtiall Bodies*, and *Motions*.

910 The Seventh is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* have brought into an *Art*, or *Precept*: And it is this; That if you deſire to Super-induce, any *Vertue* or *Diſpoſition*, upon a *Perſon*, you ſhould take the *Living Creature*, in which that *Vertue* is moſt *Eminent*, and in *Perfection*: Of that *Creature* you muſt take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you muſt take thoſe *Parts*, in the *Time*, and *Act*, when that *Vertue* is moſt in *Exerciſe*; And then you muſt apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Conſiſteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Cock*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take thoſe *Parts* immediately after the *Lion*, or the *Cocke* have beene in *Fight*; And let them be worne, upon a *Mans Heart*, or *Wreſt*. Of theſe and ſuch like *Sympathies*, we ſhall ſpeake under this preſent *Title*.

911 The Eighth and laſt is, an *Emiſſion* of *Immateriate Vertues*; Such as we are a little doubtfull to Propound; It is ſo prodigious: But that it is ſo conſtantly avouched by many: And wee have ſet it downe, as a Law to our Selves, to examine things to the Bottome; And not to receive upon Credit, or reject upon Improbabilities, untill there hath paſſed a due Examination. This is, the *Sympathy* of *Individuals*: For as there

there is a *Sympathy* of *Species*; So, (it may be) there is a *Sympathy* of *Individuals*: That is, that in *Things*, or the *Parts* of *Things*, that have been once *Contiguous*, or *Entire*, there should remaine a *Transmission* of *Vertue*, from the One to the Other: As betweene the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation* of *Unguentum Teli*: And so of a *Peece* of *Lard*, or *Sticke* of *Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke upon the other *Part Severed*. Now wee will pursue the *Instances* themselves.

Experiments in Consort touching *Emission* of *Spirits* in *Vapour*, or *Exhalation*, *Odour-like*.

912 THe *Plague* is many times taken without *Manifest Sense*, as hath been said. And they report, that where it is found, it hath a Sent, of the *Smell* of a *Mellow Apple*; And (as some say) of *May Flowers*: And it is also received, that *Smells* of *Flowers*, that are *Mellow* and *Lushious*, are ill for the *Plague*; As *White Lillies*, *Cowslips*, and *Hyacinths*.

913 The *Plague* is not easily received by such, as continually are about them, that have the *Plague*; As *Keepers* of the *Sicke*, and *Physitians*; Nor againe by such as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe* and *Seed*; &c.) Or Outward, (as *Angelica*, *Zedoarie*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and such as are of a *Dry* and *Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*.

914 The most Pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*; When *Prisoners* have beene Long, and Close, and Nastily kept; Whereof we have had, in our time, Experience, twice or thrice; when both the *Iudges* that sate upon the *Iayle*, and *Numbers* of those that attended the Businesse, or were present, *Sicken* upon it, and *Died*. Therefore it were good wisdome, that in such Cases, the *Iayle* were Aired, before they be brought forth.

915 Out of question, if such *Foule Smells* be made by *Art*, and by the Hand, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinks*, which the *Nosthrils* straight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as have some Similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may be great danger, in using such Compositions, in great Meetings of People, within Houses; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poysoning* of *Aire* is no lesse dangerous than *Poysoning* of *Water*; Which hath beene used by the *Turks* in the Warres; And was used by *Emanuel Comnenus* towards the *Christians*, when they passed thorow his *Country* to the *Holy Land*. And these *Empoysonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Because the much *Breath* of *People*, doth further the *Reception* of the *Infection*: And therefore, where any such Thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

916 The *Empoysonment* of Particular *Persons*, by *Odours*, hath beene reported

ported to be in *Perfumed Gloves*, or the like: And it is like, they Mingle the *Poyson* that is deadly, with some *Smells* that are Sweet, which also maketh it the sooner received. *Plagues* also have been raised by *Annoyntings* of the *Chincks* of *Doores*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet upon their Fingers, to put them to their *Nose*; Which Men therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot be made without *Danger* of *Death*, to them that make them. But then againe, they may have some *Antidotes* to save themselues; So that *Men* ought not to be secure of it.

There have beene, in divers *Countries*, great *Plagues*, by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they have beene dead, and cast upon Heaps. 917

It happeneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poysonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other Works about *Metals*, and *Minerals*, have their *Braines* Hurt & Stupefied by the *Metalline Vapours*. Amongst which, it is noted, that the *Spirits* of *Quick-Silver*, ever flie to the *Skull*, *Teeth*, or *Bones*; In so much as *Gilders* use to have a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Silver*; Which *Gold* afterwards they finde to be Whitened. There are also certaine *Lakes*, and *Pits*, such as that of *Avernus*, that *Poyson Birds*, (as is said,) which fly over them; Or *Men*, that stay too long about them. 918

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a Close Roome, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little & little; Enducing only a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more Sticks, they fell to make Fire of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a Generall Silence, and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell downe in a Swoune; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saved themselves. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plaistered*, if a *Fire* be made in them; Whereof no lesse *Man* than the *Emperour Iovinianus* Died. 919

Vide the *Experiments*, 803. touching the *Infectious Nature* of the *Aire*, upon the First *Showers*, after long *Drought*. 920

It hath come to passe, that some *Apothecaries*, upon *Stamping* of *Coloquintida*, have beene put into a great *Skouring*, by the *Vapour* onely. 921

It hath beene a Practice, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it provoketh a *Continuall Sneezing*, in those that are in the *Roome*. 922

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound-Eyes*; And that a *Menstruous Woman*, looking upon a *Glasse*, doth rust it. Nay they have 923

have an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going over a *Field*, or *Garden*, doe *Corne* and *Herbs* good by *Killing* the *Wormes*.

924 The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that the *Wolfe*, if hee see a *Man* first, by *Aspect* striketh a *Man* hoarse.

925 *Perfumes* Convenient doe drie and strengthen the *Braine*; And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Marie* dried, and *Lignum-Aloës*, and *Calamus*, taken at the *Mouth*, and *Nosthrils*; And no doubt there be other *Perfumes*, that doe moisten, and refresh; And are fit to be used in *Burning Agues*, *Consumptions*, and too much *Wakefulnesse*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaves* of *Vines* sprinckled with a little *Rose Water*; &c.

926 They doe use in *Sudden Faintings*, and *Swounings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are upon point to resolve, and fall away.

927 *Tobacco* comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh partly by Opening; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to trie the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*,) of other *Things*; As well to drie, and comfort, as for other *Intentions*. I wish Triall be made of the *Drying Fume*, of *Rose-Marie*, and *Lignum Aloes*, before mentioned, in *Pipes*; And so of *Nutmeg*, and *Folium Indum*; &c.

928 The *Following* of the *Plough*, hath beene approved, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rye*, is not so good; Because the *Earth* hath spent her Sweet *Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it, when you sow *Barley*. But because Ploughing is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned up, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling upon a Cushion, and *Weeding*. And these Things you may practise in the best *Seasons*; Which is ever the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* be too Moist. I knew a great *Man*, that lived Long, who had a Cleane *Clod* of *Earth*, brought to him everie *Morning*, as hee sate in his *Bed*; And hee would hold his *Head* over it, a good prettie while. I commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; Provided alwayes, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

929 They have, in *Physicke*, Use of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Provoking* of *Sleepe*, &c. For though those *Things* be not so Strong as *Perfumes*, yet you may have them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*;

Times, And besides, there be divers *Things*, that breath better of themselves, than when they come to the *Fire*; As *Nigella Romana*; the *Seed* of *Melanthium*, *Amomum*, &c.

There be two *Things*, which (inwardly used) doe Coole and condense the *Spirits*; And I wish the same to be tried outwardly in *Vapours*. The One is *Nitre*, which I would have dissolved in *Malmesey*, or *Greeke-Wine*, and so the *Smell* of the *Wine* taken; Or if you would have it more forcible, poure of it upon a *Fire-pan*, well heated, as they doe *Rose-Water*, and *Vinegar*. The other is, the *Distilled Water* of *Wilde Poppy*, which I wish to be mingled, at halfe, with *Rose-Water*, and so taken with some *Mixture* of a few *Cloves*, in a *Perfuming-Pan*. The like would be done with the *Distilled Water* of *Saffron Flowers*. 930

Smells of *Muske*, and *Amber*, and *Civit*, are thought to further *Venereous Appetite*: Which they may doe by the *Refreshing* and *Calling forth* of the *Spirits*. 931

Incense, and *Nidorous Smells*, (such as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to dispose *Men* to *Devotion*: Which they may doe, by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. Wee see, that amongst the *Iewes*, the *Principall Perfume* of the *Sanctuarie*, was forbidden all *Common Vses*. 932

There be some *Perfumes*, prescribed by the *Writers* of *Naturall Magicke*, which procure *Pleasant Dreames*; And some others, (as they say,) that procure *Propheticall Dreames*; As the *Seeds* of *Flax*, *Fleawort*, &c. 933

It is certaine, that *Odours* doe, in a small Degree, Nourish; Especially the *Odour* of *Wine*: And we see *Men* an hungred, doe love to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the House, complaine, that shee should be kept from being at a *Feast*, and *Solemnitie*, (which shee much desired to see,) because there would be a *Corps* in the House; Whereupon hee caused *Loaves* of *New Bread* to be sent for, and opened them; And powred a little *Wine* into them; And so kept himselfe alive with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke*; But the same *Man* used to have continually, a great *Wisp* of *Herbs*, that hee smelled on: And amongst those *Herbs*, some *Esculent Herbs* of strong *Sent*; As *Onions*, *Garlicke*, *Leekes*, and the like. 934

They doe use, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by those *Ill Smells*, the *Rising* of the *Mother* is put downe. 935

There be *Aires*, which the *Physitians* advise their *Patients* to remove unto, in *Consumptions*, or upon *Recoverie* of *Long Sicknesses*: Which (commonly) are *Plaine Champaignes*, but *Grasing*, and not Over-growne with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groves* of *Bayes* doe forbid *Pestilent Aires*; Which was accounted 936

accounted a great *Cause* of the Wholesome *Aire* of *Antiochia*. There be also some *Seyles* that put forth *Odorate Herbs* of themselves; As *Wilde Thyme*; *Wilde Marjoram*; *Penny-Royall*; *Camomill*; And in which the *Brier-Roses* smell almost like *Muske-Rosts*; Which (no doubt) are *Signes* that doe discover an *Excellent Aire*.

937 It were good for *Men*, to thinke of having *Healthfull Aire*, in their *Houses*; Which will never be, if the *Roomes* be *Low-roofed*, or full of *Windowes*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it Exceeding *Unequall*; Which is a great Enemie to *Health*. The *Windowes* also should not be high up to the *Roofe*, (which is in use for Beautie and Magnificence,) but Low. Also *Stone-Walls* are not wholesome; But *Timber* is more wholesome; And especially *Brick*. Nay it hath beene used by some, with great Successe, to make their *Walls* thicke; And to put a Lay of *Chalke* betweene the *Bricks*, to take away all *Dampishnesse*.

Experiment Solitary, touching the *Emissions* of *Spirituall Species* which *Affect* the *Senses*.

938 THese *Emissions*, (as wee said before,) are handled, and ought to be handled, by themselves, under their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to give some generall *Observations*, Common to both. First, they seeme to be *Incorporeall*. Secondly, they Worke *Swiftly*. Thirdly, they Worke at *Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effective* of any *Thing*; Nor leave no *Work* behind them; But are *Energies* meerely; For their *Working* upon *Mirrours*, and *Places* of *Echo*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Repercussed*. And as for the *Shaking* of *Windowes*, or *Rarefying* the *Aire* by *Great Noyses*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake* a *Nature*, as they affect onely such a Rare, and Attenuate *Substance*, as is the *Spirit* of *Living Creatures*.

Experiments in Consort, touching the *Emission* of *Immateriate Vertues* from the *Mindes*, and *Spirits* of *Men*, either by *Affections*, or by *Imaginations*, or by other *Impressions*.

939 IT is mentioned in some *Stories*, that where *Children* have beene *Exposed*, or taken away young from their *Parents*; And that afterwards they have approached to their *Parents* presence, the *Parents*, (though they have not knowne them,) have had a *Secret Joy*, or Other *Alteration* thereupon.

940 There was an *Ægyptian South-Sayer*, that made *Anthonius* beleeve, that his *Genius*, (which otherwise was *Brave*, and *Confident*,) was, in the Presence of *Octavianus Cæsar*, *Poore*, and *Cowardly*: And therefore, he advised him, to absent himselfe, (as much as he could,) and remove far from him. This *South-Sayer* was thought to be suborned by *Cleopatra*, to make him live in *Ægypt*, and other Remote *Places* from *Rome*. However, the Conceit of a *Predominant* or *Mastering Spirit*, of one *Man* over Another, is Ancient, and Received still, even in *Vulgar Opinion*.

There

941 There are Conceits, that some *Men*, that are of an *Ill*, and *Melancholy Nature*, doe incline the *Company*, into which they come, to be *Sad*, and *Ill disposed*; And contrariwise, that Others, that are of a *Iovially Nature*, doe dispose the *Company* to be *Merrie* and *Cheerefull*. And againe, that some *Men* are *Luckie* to be *kept Company* with, and *Employed*; And Others *Unluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence* one with another, as well as from *Body* to *Body*.

942 It hath been observed, that *Old Men*, who have loved *Young Company*, and beene Conversant continually with them, have beene of *Long Life*; Their *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which ever had *Young Auditours*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who lived till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *School-Masters*; such a was *Orbilius*, &c.

943 *Audacitie* and *Confidence* doth, in Civill Businesse, the great Effects, as a *Man* may (reasonably) doubt, that besides the Vertue *Daring*, and *Earnestnesse*, and *Persisting*, and *Importunitie*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits*, to such *Persons*.

944 The *Affections* (no doubt) doe make the *Spirits* more *Powerfull*, and *Active*; And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Love*, and *Envie*, which is called *Oculus Malus*. As for *Love*, the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Lover*, doth passe into the *Spirits*, of the *Person Loved*; Which causeth the desire of Returne into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contract*, and *Conjunction*, which is in *Lovers*. And this is observed likewise, that the *Aspects* that procure *Love*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Envie*, that emitteth some *Maligne* and *Poysonous Spirits*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most Dangerous, when an *Envious Eye* is cast upon *Persons* in *Glory*, and *Triumph*, and *Joy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Envious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* have beene ill disposed, for some Dayes following. Wee see the Opinion of *Fascination* is Ancient, for both *Effects*, Of Procuring *Love*; And *Sickenesse* caused by *Envie*: And *Fascination* is ever by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most Forcibly by the *Eye*.

945 *Feare*, and *Shame*, are likewise *Infective*; For wee see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalfe.

Now wee will speake of the *Force* of *Imagination* upon other *Bodies*; And of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I understand to be, the *Representation* of an *Individuall Thought*. *Imagination* is of three Kinds: The First *Joyned* with *Beleefe* of that which is to *Come*: The Second *Joyned* with *Memorie* of that which is *Past*; And the Third is of *Things Present*, or as if they were *Present*; For I comprehend in this, *Imaginations Faigned*, and at *Pleasure*; As if one should *Imagine* such a *Man* to be in the *Vestments* of a *Pope*; Or to have *Wings*. I single out, for this time, that which is with *Faith*, or *Beleefe* of that which is to *Come*. The *Inquisition* of this *Subject*, in our way, (which is by *Induction*,) is wonderfull hard; for the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly be made, but with Extreme Caution, for the Reason which we will hereafter declare.

The *Power* of *Imagination* is in three Kindes; The First, upon the *Body* of the *Imaginant*; Including likewise the *Child* in the *Mothers Womb*; The Second is, the *Power* of it upon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*, &c. The Third is, the *Power* of it, upon the *Spirits* of *Men*, and *Living Creatures*; And with this last we will onely meddle.

The *Probleme* therefore is, whether a *Man Constantly* and *Strongly Beleeving*, that such a *Thing* shal be; (As that such an *One* will *Love Him*; Or that such an *One* will *Grant Him* his *Request*; Or that such an *One* shall *Recover* a *Sickneſſe*; Or the like;) It doth help any thing to the *Effecting* of the *Thing* it selfe. And here againe we must warily distinguish; For it is not meant, (as hath beene partly said before,) that it should help by *Making* a *Man* more *Stout*, or more *Industrious*; (In which kinde a *Constant Beleefe* doth much;) But meerely by a *Secret Operation*, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard (as we began to say,) to make any *New Experiment*; For I cannot *command* my Selfe to *Beleeve* what I will, and so no *Triall* can be made. Nay it is worse; For whatsoever a *Man Imagineth doubtingly*, or with *Feare*, must needs doe hurt, if *Imagination* have any *Power* at all;

For

For a *Man* representeth that other, that hee feareth, than the contrarie.

The Help therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beleefe*, and not by *Himselfe*; Untill *Himselfe* have found by *Experience*, that *Imagination* doth prevaile; For then *Experience* worketh in *Himselfe Beleefe*; If the *Beleefe*, that such a *Thing* shall be, be joyned with a *Beleefe*, that his *Imagination* may procure it.

For Example; I related one time to a *Man*, that was Curious, and Vaine enough in these Things; *That I saw a Kinde of* Iuggler, *that had a* Paire *of* Cards, *and would tell a* Man *what* Card *he thought*. This Pretended Learned Man told mee; It was a Mistaking in Mee; *For* (*said hee*) *it was not the* Knowledge *of the* Mans Thought, (*for that is Proper to* God,) *but it was the* Inforcing *of a* Thought *upon him, and* Binding *his* Imagination *by a* Stronger, *that hee could* Thinke no other *Card*. And thereupon he asked me a *Question*, or two, which I thought he did but cunningly, knowing before what used to be the *Feats* of the *Iuggler*. *Sir*, (*said hee*,) *doe you remember whether hee told the* Card, *the* Man *thought*, Himselfe, *or bade* Another *to tell it*. I answered (as was true;) *That he bade Another tell it*. Whereunto he said; *So I thought*: *For* (*said he*) *Himselfe could not have put on so strong an* Imagination; *But by telling the other the* Card, (*who believed that the* Iuggler *was some Strange* Man, *and could doe Strange* Things,) *that other* Man *taught a strong* Imagination. I harkened unto him, thinking for a Vanitie he spoke prettily. Then he asked me another *Question*: Saith he; *Doe you remember*, *whether he bade the* Man *thinke the* Card *first*, *and afterwards told the other* Man *in his Eare*, *what he should thinke*, *Or else that he did whisper first in the* Mans *Eare*, *that should tell the* Card, *telling that such a* Man *should thinke such a* Card, *and after bade the* Man *thinke a* Card? I told him, as was true; *That he did first whisper the* Man *in the Eeare*, *that such a* Man *should thinke such a* Card: Upon this the *Learned Man* did much Exult, and Please himselfe, saying; *Loe*, *you may see that my* Opinion *is right*: *For if the* Man *had thought first*, *his* Thought *had beene Fixed*; *But the other* Imagining *first*, *bound his* Thought. Which though it did somewhat sinke with me, yet I made it Lighter than I thought, and said; *I thought it was* Confederacie, *betweene the* Iuggler, *and the two* Servants: Though (indeed) I had no Reason so to thinke: For they were both my *Fathers* Servants; And hee had never plaid in the House before. The *Iuggler* also did cause a *Garter* to be held up; And tooke upon him, to know, that such an *One*, should point in such a *Place*, of the *Garter*; As it should be neare so many *Inches* to the *Longer End*, and so many to the *Shorter*; And still he did it, by *First Telling* the *Imaginer*, and after *Bidding* the *Actour Thinke*.

Having told this *Relation*, not for the Weight thereof, but

because it doth handsomely open the *Nature* of the *Question*. I returne to that I said; That *Experiments* of *Imagination*, must be practised by Others, and not by a *Mans* Selfe. For there be Three *Meanes* to fortifie *Beleefe*: The First is *Experience*: The Second is *Reason*: And the Third is *Authoritie*: And that of these, which is farre the most *Potent*, is *Authoritie*: For *Beleefe* upon *Reason*, or *Experience*, will Stagger.

947 For *Authoritie*, it is of two Kindes; *Beleefe* in an *Art*; And *Beleefe* in a *Man*. And for Things of *Beleefe* in an *Art*; A *Man* may exercise them by *Himselfe*; But for *Beleefe* in a *Man*, it must be by *Another*. Therefore, if a *Man* beleeve in *Astrologie*, and finde a *Figure* Prosperous; Or beleeve in *Naturall Magicke*, and that a *Ring* with such a *Stone*, or such a *Peece* of a *Living Creature*, Carried, will doe good; It may help his *Imagination*: But the *Beleefe* in a *Man* is farre the more *Active*. But howsoever, all *Authoritie* must be out of a *Mans Selfe*, turned (as was said,) either upon an *Art*, or upon a *Man*: And where *Authoritie* is from one *Man* to another, there the Second must be *Ignorant*, and not *Learned*, or *Full* of *Thoughts*; And such are (for the most part) all *Witches*, and *Superstitious Persons*; Whose *Beleefes*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reason*, or *Experience*: And upon the same Reason, in *Magicke*, they use (for the most part,) *Boyes*, and *Young People*; whose *Spirits* easiliest take *Beleefe*, and *Imagination*.

Now to fortifie *Imagination*, there be three wayes: The *Authoritie* whence the *Beleefe* is derived; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refresh* it.

948 For the *Authoritie*, wee have already spoken: As for the Second; Namely the *Meanes* to *Quicken*, and *Corroborate* the *Imagination*; We see what hath been used in *Magick*; (If there be in those Practises any thing that is purely *Naturall*;) As *Vestments*; *Characters*; *Words*; *Seales*; Some *Parts* of *Plants*, or *Living Creatures*; *Stones*; *Choice* of the *Houre*; *Gestures* and *Motions*; Also *Incenses*, and *Odours*; *Choice* of *Societie*, which increaseth *Imagination*; *Diets* and *Preparations* for some time before. And for *Words*, there have beene ever used, either *Barbarous words*, of no Sense, lest they should disturb the *Imagination*; Or *Words* of *Similitude*, that may second and feed the *Imagination*: And this was ever as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are used also *Scripture-Words*; For that the *Beleefe*, that *Religious Texts*, and *Words*, have Power, may strengthen the *Imagination*. And for the same Reason, *Hebrew Words*, (which amongst us is counted the *Holy Tongue*, and the *Words* more *Mysticall*,) are often used.

949 For the *Refreshing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) We see the Practices of *Magicke*, as in *Images* of *Wax*, and

and the like, that should Melt by little, and little; Or some other *Things Buried* in *Mucke*, that should Putrifie by little and little; Or the like: For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Immateriate a Vertue*, as to worke at great *Distances*, Or through all *Mediums*; Or upon all *Bodies*: But that the *Distance* must be Competent; The *Medium* not Adverse; And the *Body* Apt and Proportionate. Therefore if there be any Operation upon *Bodies*, in Absence, by Nature; it is like to be conveyed from *Man* to *Man*, as *Fame* is; As if a *Witch*, by *Imagination*, should hurt any afarre off, it cannot be naturally, but by Working upon the *Spirit* of some, that commeth to the *Witch*; And from that *Partie* upon the *Imagination* of *Another*; And so upon *Another*; till it come to one that hath resort to the *Partie Intended*; And so by *Him* to the *Partie intended himselfe*. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Partie*, or the like; yet there is lesse Credit to be given to those Things, except it be by *Working* of evill *Spirits*. 950

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, upon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare Proofes; For that they may be, by a Tacite *Operation* of *Maligne Spirits*: We shall therefore be forced, in this *Enquirie*, to resort to New *Experiments*: Wherein we can give only *Directions* of *Trialls*, and not any *Positive Experiments*. And if any *Man* thinke, that we ought to have stayed, till wee had made *Experiment*, of some of them, our selves, (as wee doe commonly in other *Titles*,) the Truth is, that these *Effects* of *Imagination* upon other *Bodies*, have so little Credit with us, as we shall trie them at leisure: But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessarie, that He, by whom you worke, have a *Precedent Opinion* of you, that you can doe Strange Things; Or that you are a *Man* of *Art*, as they call it; For else the Simple *Affirmation* to Another, that this or that shall be, can worke but a weake *Impression*, in his *Imagination*. 951

It were good, because you cannot discerne fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did use the *Imagination* of more than *One*; That so you may light upon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Servants*, that their *Master* shall surely recover. 952

The *Imagination* of *One*, that you shall use, (such is the Varietie of *Mens Mindes*,) cannot be alwayes alike *Constant*, and *Strong*; And if the 953

Successe follow not speedily, it will faint and leese *Strength*. To remedy this, you must pretend to Him, whose *Imagination* you use, severall *Degrees* of *Meanes*, by which to *Operate*; As to prescribe him, that every three Dayes, if he finde not the Successe Apparent, he doe use another Shoe, or *Part* of a *Boast*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another; till Seven Times. Also you must prescribe a good Large Time for the *Effect* you promise; As if you should tell a *Servant* of a *Sick-Man*, that his *Master* shall recover, but it will be Fourteene dayes, ere hee findeth it apparently, &c. All this to entertaine the *Imagination*, that it waver lesse.

954 It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenses* and *Perfumes* taken at the *Nosthrills*; And *Ointments* of some *Parts*; doe (naturally) worke upon the *Imagination* of Him that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you use, if you prescribe him, before he doe use the *Receit*, for the *Worke* which he desireth, that hee doe take such a *Pill*, or a *Spoonefull* of *Liquour*; Or burne such an *Incense*; Or *Annoint* his *Temples*, or the *Soles* of his *Feet*, with such an *Ointment*, or *Oyle*: And you must chuse, for the *Composition* of such *Pill*, *Perfume*, or *Ointment*, such *Ingredients*, as doe make the *Spirits*, a little more *Grosse*, or *Muddie*: Whereby the *Imagination* will fix the better.

955 The *Body Passive*, and to be *Wrought Upon*, (I meane not of the *Imaginant*,) is better wrought upon, (as hath beene partly touched,) at some *Times*, than at others: As if you should prescribe a *Servant*, about a *Sicke Person*, (whom you have possessed, that his *Master* shall recover,) when his *Master* is fast asleepe, to use such a *Root*, or such a *Root*. For *Imagination* is like to worke better upon *Sleeping Men*, than *Men Awake*, As we shall shew when we handle *Dreames*.

956 Wee finde in the *Art* of *Memorie*, that *Images Visible*, worke better than other *Conceits*: As if you would remember the Word *Philosophy*, you shall more surely doe it, by *Imagining* that such a *Man*, (For *Men* are best *Places*,) is reading upon *Aristotles Physicks*; Than if you should Imagine him to say; *I'le goe studie Philosophy*. And therefore, this *Observation* would be translated to the *Subject* wee now speake of: For the more Lustrous the *Imagination* is, it filleth and fixeth the better. And therefore I conceive, that you shall, in that *Experiment*, (whereof wee spake before,) of *Binding* of *Thoughts*, lesse faile, if you tell One, that such an *One* shall name one of *Twentie Men*, than if it were *One* of *Twentie Cards*. The *Experiment* of *Binding* of *Thoughts*, would be Diversified, and tried to the Full: And you are to note, whether it hit for the most part, though not alwayes.

957 It is good to consider, upon what *Things*, *Imagination* hath most Force: And the *Rule*, (as I conceive,) is, that it hath most *Force* upon *Things*, that have the *Lightest*, and *Easiest Motions*. And therefore above all, upon the *Spirits* of *Men*: And in them, upon such *Affections*, as move *Lightest*; As upon *Procuring* of *Love*; *Binding* of *Lust*, which is ever

ever with *Imagination*, upon *Men* in *Feare*; Or *Men* in *Irresolution*; And the like. Whatsoever is of this kinde would be thorowly enquired. *Trialls* likewise would be made upon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would Dye this yeare, And will him, at these and these times, to goe unto it, to see how it thriveth. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are verie *Light Motions*: And there is a *Folly* verie usuall, that *Gamesters* imagine, that some that stand by them, bring them ill Luck. There would be Triall also made, of holding a *Ring* by a *Thread* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such *Name*, it shall goe off their *Fingers*: For these two are Extreme *Light Motions*. And howsoever I have no *Opinion* of these things, yet so much I conceive to be true; That *Strong Imagination* hath more Force upon *Things Living*; Or that have beene *Living*, than *Things* meerely *Inanimate*: And more Force likewise upon *Light*; and *Subtill Motions*, than upon *Motions Vehement*, or *Ponderous*.

It is an usuall *Observation*, that if the *Body* of One *Murthered*, be brought before the *Murtherer*, the *Wounds* will bleed a fresh. Some doe affirme, that the *Dead Body*, upon the Presence of the *Murtherer*, hath opened the *Eyes*; And that there have beene such like *Motions*, as well where the *Partie Murthered* hath beene *Strangled*, or *Drowned*, as where they have beene *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Iust Iudgement, who usually bringeth *Murthers* to Light: But if it be *Naturall*, it must be referred to *Imagination*. 958

The *Tying* of the *Point* upon the day of *Marriage*, to make *Men* Impotent towards their *Wives*, which (as wee have formerly touched,) is so frequent in *Zant*, and *Gascony*, if it be *Naturall*, must be referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceive it to have the lesse Affinitie with *Witchcraft*, because not Peculiar Persons onely, (such as *Witches* are,) but any *Body* may doe it. 959

THere be many *Things*, that worke upon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Pretious Stones*, worne, have been anciently and generally Received; And curiously assigned to worke severall *Effects*. So much is true; That *Stones* have in them fine *Spirits*; As appeareth by their *Splendour*: And therefore they may work by *Consent* upon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth* or *Entall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no Credit to be given to them. But it is manifest, that *Light*, above all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is verie probable, that *Light Varied* doth the same *Effect*, with more *Noveltie*. And this is one of the *Causes*, why *Pretious Stones* comfort. And therefore it were good to haue *Tinctcd Lanthornes*, or

Experiments in Consort touching the *Secret Vertue* of *Sympathy*, and *Antipathy*. 960

or *Tinsted Skreenes*, of *Glasse Coloured* into *Greene*, *Blew*, *Carnation*, *Crimson*, *Purple*, &c. And to use them with *Candles* in the *Night*. So likewise to have Round *Glasses*, not onely of *Glasse Coloured thorow*, but with *Colours* laid betweene *Crystals*, with *Handles* to hold in ones Hand. *Prismes* are also Comfortable Things. They have of *Paris-Worke*, *Looking-Glasses*, bordered with broad *Borders* of small *Crystall*, and great Counterfeit *Pretious Stones*, of all *Colours*, that are most Glorious and Pleasant to behold; Especially in the *Night*. The *Pictures* of *Indian Feathers*, are likewise Comfortable, and Pleasant to behold. So also Faire and Cleare *Pooles* doe greatly comfort the *Eyes*, and *Spirits*; Especially when the *Sunne* is not *Glaring*, but *Overcast*; Or when the *Moone* shineth.

961 There be divers Sorts of *Bracelets* fit to *Comfort* the *Spirits*; And they be of Three *Intentions*: *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wish them to be of *Pearle*, or of *Corall*, as is used: And it hath beene noted that *Corall*, if the *Partie* that weareth it be ill disposed, will wax *Pale*: Which I beleeve to be true, because otherwise *Distemper* of *Heat* will make *Corall* lose Colour. I Commend also *Beads*, or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with some *Cordiall Mixture*.

962 For *Corroboration* and *Confortation*, take such *Bodies* as are of *Astringent Qualitie*, without *Manifest Cold*. I commend *Bead-Amber*, which is full of *Astriction*, but yet is *Vnctuous*, and not *Cold*; And is conceived to *Impinguate* those that weare such *Beads*: I commend also, *Beads* of *Harts-Horne*, and *Ivorie*, which are of the like Nature; Also *Orenge-Beads*; Also *Beads* of *Lignum Aloës*, *Macerated* first in *Rose-Water*, and *Dryed*.

963 For *Opening*, I Commend *Beads*, or *Peeces* of the *Roots* of *Carduus Benedictus*: Also of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rew*.

964 The Cramp, (no doubt) commeth of *Contraction* of *Sinnewes*; Which is Manifest, in that it commeth either by *Cold*, or *Drinesse*; As after *Consumptions*, and *Long Agues*; For *Cold* and *Drinesse* doe (both of them) *Contract*, and *Corrugate*. Wee see also, that *Chafing* a little above the *Place* in paine, easeth the *Cramp*; Which is wrought by the *Dilatation*, of the *Contracted Sinnewes*, by *Heat*. There are in use, for the Prevention of the *Cramp*, two Things; The one *Rings* of *Sea-Horse Teeth*, worne upon the *Fingers*; The other *Bands* of *Greene Periwinckle*, (the Herb,) tied about the *Calfe* of the *Leg*, or the *Thigh*, &c. where the *Cramp* useth to come. I doe finde this the more strange, because Neither of these have any *Relaxing Vertue*, but rather the Contrarie. I judge therefore, that their *Working*, is rather upon the *Spirits*, within the *Nerves*, to make them strive lesse; Than upon the *Bodily Substance* of the *Nerves*.

965 I would have *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* the *Heart*, and *Spirits*; The one of the *Trochisch* of *Vipers*, made into little *Peeces* of *Beads*; For since they do great Good Inwards, (especially for *Pestilent Agues*,) it is like they will be Effectuall Outwards; Where they may be applied in greater *Quantitie*. There would be *Trochisch* likewise

wise made of *Snakes*; Whose *Flesh dried*, is thought to have a verie *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall Ingredient in their *Cordiall Confection Alkermes*: The *Beads* would be made up with *Amber-Grice*, and some *Pomander*.

It hath beene long received, and confirmed by divers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth help the *Suckling-Sickneſſe*; And likewise the *Incubus*, which wee call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therefore the *Working* is, by *Extreme* and *Subtill Attenuation*; Which that *Simple* hath. I judge the like to be in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c.

There is a *Stone*, which they call the *Bloud-Stone*, which worne is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is by *Astriction*, and *Cooling* of the *Spirits*. *Quære*, if the *Stone* taken out of the *Toads Head*, be not of the like Vertue; For the *Toad* loveth *Shade*, and Coolenesse.

Light may be taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinckle*, how that those things, which asswage the *Strife* of the *Spirits*, doe help diseases, contrarie to the *Intention* desired: For in the *Curing* of the *Cramp*, the *Intention* is to relax the *Sinnewes*; But the *Contraction* of the *Spirits*, that they strive lesse, is the best Help: So to procure easie *Trauailes* of *Women*, the Intention is to bring downe the *Childe*; But the best Help is, to stay the *Comming downe* too *Fast*: Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pestilent Feavers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Evaporation*; But the best *Meanes* to doe it, is by *Nitre*, *Diascordium*, and other *Coole Things*, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily; *In the Quenching of the Flame of a Pestilent Ague, Nature is like People, that come to quench the Fire of a House; which are so busie, as one of them letteth another.* Surely, it is an Excellent *Axiome*, and of Manifold *Vse*, that whatsoever appeaseth the *Contention* of the *Spirits*, further thereth their *Action*.

The *Writers* of *Naturall Magick*, commend the Wearing of the *Spoile* of a *Snake*, for *Preserving* of *Health*. I doubt it is but a *Conceit*; For that the Snake is thought to renue her *Youth*, by Casting her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a Peece of a *Harts-Horne*, because those Renue.

It hath beene Anciently *Received*, (For *Pericles* the *Athenian* used it,) and it is yet in use, to weare little *Bladders* of *Quick-Silver*, or *Tablets* of *Arsenicke*, as *Preservatives* against the *Plague*: Not as they conceive, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poysons* themselves, they draw the *Venome* to them, from the *Spirits*.

Vide the *Experiments* 95. 96. and 97. touching the *Severall Sympathies*, and *Antipathies*, for *Medicinall Vse*.

It

972 It is ſaid, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beaſt* of great *Edacitie* and *Digeſtion*; And ſo, it may be, the *Parts* of him comfort the *Bowels*.

973 We ſee *Scare-Crowes*, are ſet up to keep *Birds* from *Corne*, and *Fruit*; It is reported by ſome, that the *Head* of a *Wolfe*, whole, dried, and hanged up in a *Dove-Houſe*, will ſcare away *Vermine*; Such as are *Weaſils*, *Rattes*, and the like. It may be, the *Head* of a *Dog* will doe as much; For thoſe *Vermine* with us, know *Dogs* better than *Wolves*.

974 The *Braines* of ſome *Creatures*, (when their *Heads* are roaſted) taken in *Wine*, are ſaid to ſtrengthen the *Memorie*: As the *Braines* of *Hares*; *Braines* of *Hens*; *Braines* of *Deeres*, &c. And it ſeemeth, to be incident to the *Braines* of thoſe *Creatures*, that are Fearefull.

975 The *Ointment*, that *Witches* uſe, is reported to be made, of the *Fat* of *Children*, digged out of their *Graves*; Of the *Iuyces* of *Smallage*, *Wolfebane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I ſuppoſe that the *Soporiferous Medicines* are likeſt to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaves*, &c.

976 It is reported by ſome, that the *Affections* of *Beaſts*, when they are in ſtrength, doe adde ſome *Vertue*, unto *Inanimate Things*; As that the *Skin* of a *Sheepe*, devoured by a *Wolfe*, moveth *Itching*; That a *Stone*, bitten by a *Dog* in Anger, being throwne at him, drunke in *Powder*, provoketh *Choler*.

977 It hath beene obſerved, that the *Diet* of *Women* with *Childe*, doth worke much upon the *Infant*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed*, (the *Nature* of both which is to repreſſe and ſtay *Vapours*, that aſcend to the *Braine*,) it will make the *Childe* Ingenious: And on the contrarie ſide, if the *Mother* eat (much) *Onions*, or *Beanes*, or ſuch *Vapourous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Faſt* much; Or be given to much *Muſing*; (All which ſend, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memorie*: And I make the ſame Iudgement of *Tobacco*, often taken by the *Mother*.

978 The *Writers* of *Naturall Magick* report, that the *Heart* of an *Ape*, worne neare the *Heart*, comforteth the *Heart*, and increaſeth *Audacitie*. It is true, that the *Ape* is a Merrie and Bold *Beaſt*. And that the ſame *Heart* likewiſe of an *Ape*, applyed to the *Necke*, or *Head*, helpeth the *Wit*; And is good for the *Falling-Sickneſſe*: The *Ape* alſo is a Wittie *Beaſt*, and hath a *Dry Braine*; Which may be ſome *Cauſe* of *Attenuation* of *Vapours* in the *Head*. Yet it is ſaid to move *Dreames* alſo. It may be, the *Heart* of a *Man* would doe more, but that it is more againſt *Mens* Mindes to uſe it; Except it be in ſuch as weare the *Reliques* of *Saints*.

979 The *Fleſh* of a *Hedge-Hog*, Dreſſed, & Eaten, is ſaid to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, muſt needs be *Harſh*, & *Dry*, becauſe it putteth forth ſo many *Prickles*: For *Plants* alſo, that are full of *Prickles*,

Prickles, are generally Dry: As *Briars*, *Thornes*, *Berberries*: And therefore the *Aſhes* of an *Hedge-Hog* are ſaid to be a great *Deſiccative* of *Fiſtula's*.

Mummy hath great force in *Stanching* of *Bloud*; which, as it may be aſcribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may alſo partake of a Secret *Proprietie*; In that the *Bloud* draweth *Mans Fleſh*. And it is approved, that the *Moſſe*, which groweth upon the *Skull* of a *Dead Man*, unburied, will ſtanch *Bloud* potently. And ſo doe the *Dregs*, or *Powder* of *Bloud*, ſevered from the *Water*, and *Dried*. 980

It hath beene practiſed, to make *White Swallowes*, by *Annointing* of the *Egs* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more Penurious. And it may be, the *Annointing* of the *Egs*, will be as Effectuall, as the *Annointing* of the *Body*; Of which *Vide* the *Experiment* 93. 981

It is reported, that the *White* of an *Egge*, or *Bloud*, mingled with *Salt-Water*, doth gather the *Saltneſſe*, and maketh the *Water* ſweeter. This may be by *Adheſion*; As in the 6. *Experiment* of *Clarification*: It may be alſo, that *Bloud*, and the *White* of an *Egge*, (which is the *Matter* of a *Living Creature*,) have ſome *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. We ſee that *Salt*, laid to a *Cut Finger*, healeth it; So as it ſeemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*. 982

It hath beene anciently received, that the *Sea-Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the Body,) and erodeth them. Wher of the *Cauſe* is conceived to be, a *Qualitie* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* have upon the *Watrie Parts* of the *Bodie*; As *Vrine* and *Hydropicall Water*. And it is a good *Rule*, that whatſoever hath an *Operation* upon certaine *Kindes* of *Matters*, that, in *Mans Body*, worketh moſt upon thoſe *Parts*, wherein that kinde of *Matter* aboundeth. 983

Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathy* with the ſame *Thing*, when it is *Alive*, and when it is *Sound*; And with thoſe *Parts* which doe *Excerne*: As a *Carkaſſe* of *Man* is moſt *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horſe* to an *Horſe*, &c. *Purulent Matter* of *Wounds*, and *Vlcers*, *Carbuncles*, *Pocks*, *Scabs*, *Leprouſie*, to *Sound Fleſh*; And the *Excrement* of everie *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are leſſe Pernicious than the *Corruptions*. 984

It is a Common *Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection*, ſome Pettie *Fellow* is ſent out to kill the *Dogs*; And that, though they have never ſeene him before, yet they will all come forth, and barke, and flie at him. 985

The *Relations* touching the *Force* of *Imagination*, and the *Secret Inſtincts* of *Nature*, are ſo uncertaine, as they require a great deale of *Examination*, ere wee conclude upon them. I would have it firſt thorowly inquired, whether there be any Secret Paſſages of *Sympathy*, betweene 986

Perſons

Persons of *neare Bloud*; As *Parents*, *Children*, *Brothers*, *Sisters*, *Nurse-Children*, *Husbands*, *Wives*, &c. There be many Reports in *Historie*, that upon the *Death* of *Persons* of such Neareneſſe, *Men* have had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dreame*, which I told to divers *English Gentlemen*; That my *Fathers House*, in the *Countrey*, was *Plaſtered* all over with *Blacke Mortar*. There is an Opinion abroad, (whether Idle or no I cannot ſay,) That loving and kinde *Husbands*, have a *Senſe* of their *Wives Breeding Childe*, by ſome *Accident* in their owne *Bodie*.

987 Next to thoſe that are *Neare* in *Bloud*, there may be the like *Paſſages* and *Inſtincts* of *Nature*, betweene great *Friends*, and *Enemies*: And ſometimes the Revealing is unto Another *Perſon*, and not to the *Partie* Himſelfe. I remember *Philippus Commineus*, (a grave Writer,) reporteth; That the *Arch-Biſhop* of *Vienna*, (a *Reverend Prelate*,) ſaid (one day) after *Maſſe*, to *King Lewis* the eleventh of *France*; *Sir, your Mortall Enemie is dead*; What time *Duke Charles* of *Burgundie* was Sitting at the *Battell* of *Granſon*, againſt the *Switzers*. Some triall alſo would be made, whether *Pact* or *Agreement* doe any thing; as if two *Friends* ſhould agree, that ſuch a *Day* in everie *Weeke*, they being in farre *Diſtant Places*, ſhould *Pray* one for Another; Or ſhould cut on a *Ring*, or *Tablet*, one for anothers Sake; Whether if one of them ſhould breake their *Vow* and *Promiſe*, the other ſhould have any *Feeling* of it, in *Abſence*.

988 If there be any *Force* in *Imaginations* and *Affections* of *Singular Perſons*; It is Probable the *Force* is much more in the *Impreſſions* and *Affections* of *Multitudes*: As if a *Victorie* ſhould be won, or loſt, in *Remote Parts*, whether is there not ſome *Senſe* thereof, in the *People* whom it concerneth; Becauſe of the great *Joy*, or *Griefe*, that many *Men* are poſſeſt with, at once? *Pius Quintus*, at the verie time, when that Memorable *Victorie* was won, by the *Chriſtians*, againſt the *Turks*, at the *Navall Battell* of *Lepanto*, being then hearing of *Cauſes* in *Conſiſtorie*, brake off ſuddenly, and ſaid to thoſe about him, *It is now more time, wee ſhould give thanks to God, for the great Victorie hee hath granted us, againſt the Turks*. It is true, that *Victorie* had a *Sympathy* with his *Spirit*; For it was meerely his Worke, to conclude that *League*. It may be, that *Revelation* was *Divine*: But what ſhall we ſay then, to a Number of *Examples*, amongſt the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Playes*, have had Newes of *Victories*, and *Overthrowes*, ſome few dayes, before any *Meſſenger* could come.

It is true, that that may hold in theſe Things, which is the generall *Root* of *Superſtition*: Namely, that *Men* obſerve when *Things Hit*, and not when they *Miſſe*: And commit to Memorie the one, And forget and paſſe over the other. But touching *Divination*, and the *Miſgiving* of *Mindes*, wee ſhall

ſhall ſpeake more, when wee handle in generall, the *Nature* of *Mindes*, and *Soules*, and *Spirits*.

Wee have given formerly ſome *Rules* of *Imagination*; And touching the *Fortifying* of the Same. Wee have ſet downe alſo ſome few *Inſtances*, and *Directions*, of the *Force* of *Imagination*, upon *Beaſts*, *Birds*, &c. upon *Plants*; And upon *Inanimate Bodies*: Wherein you muſt ſtill obſerve, that your *Trialls* be upon *Subtill* and *Light Motions*, and not the contrary; For you will ſooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*: And I leave it to every *Man*, to chooſe *Experiments*, which himſelfe thinketh moſt Commodious; Giving now but a few *Examples* of every of the Three Kindes. 989

Uſe ſome *Imaginant*, (obſerving the *Rules* formerly preſcribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Trie alſo the *Imagination* of ſome, whom you ſhall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Cocke* more Hardy, and the other more Cowardly. It would be tried alſo, in *Flying* of *Hawkes*; Or in *Courſing* of a *Deere*, or *Hare*, with *Grey-hounds*; Or in *Horſe-Races*; And the like *Comparative Motions*: For you may ſooner by *Imagination*, quicken or ſlacke a *Motion*, than raiſe or ceaſe it; As it is eaſier to make a *Dogge* goe ſlower, than to make him ſtand ſtill that he may not run. 990

In *Plants* alſo, you may trie the *Force* of *Imagination*, upon the *Lighter* Sort of *Motions*: As upon the Sudden *Fading*, or Lively *Comming up* of *Herbs*; Or upon their *Bending* one way, or other; Or upon their *Cloſing*, and *Opening*; &c. 991

For *Inanimate Things*, you may trie the *Force* of *Imagination*, upon Staying the *Working* of *Beere*, when the *Barme* is put in; Or upon the *Comming* of *Butter*, or *Cheeſe*, after the *Cherming*, or the *Rennet* bee put in. 992

It is an Ancient *Tradition*, every where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long Sticke, doth ſtupefie the *Hand* of him that toucheth it. It is one degree of *Working* at *Diſtance*, to worke by the Continuance of a Fit *Medium*; As *Sound* will be conveyed to the *Eare*, by ſtriking upon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*. 993

The *Writers* of *Naturall Magicke*, doe attribute much to the *Vertues*, that come from the *Parts* of *Living Creatures*; So as they be taken from them, the *Creatures* remaining ſtill alive: As if the *Creature* ſtill living did infuſe ſome *Immateriate Vertue*, and *Vigour*, into the *Part Severed*. So much may be true; that any *Part*, taken from a *Living Creature*, newly *Slaine*, may be of greater force, than if it were taken from the like *Creature*, *dying* of it *Selfe*, becauſe it is fuller of *Spirit*. 994

Triall would be made, of the like *Parts* of *Individualls*, in *Plants*, and *Living Creatures*; As to cut off a *Stocke* of a *Tree*; And to lay that, which you cut off, to *Putriſe*, to ſee whether it will Decay the Reſt of the *Stocke*: Or if you ſhould cut off part of the *Taile*, or *Legge* of a *Dogge*, 995

or a *Cat*, and lay it to *Putrifie*, and ſo ſee whether it will *Feſter*, or keepe from *Healing*, the *Part* which remaineth.

996 It is received, that it helpeth to *Continue Love*, if one weare a *Ring*, or a *Bracelet*, of the *Haire* of the *Party Beloved*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Glove*, or other like *Favour*, may as well doe it.

997 The *Sympathie* of *Individuals*, that have beene *Entire*, or have *Touched*, is of all others the moſt *Incredible*: Yet according unto our faithfull Manner of *Examination* of *Nature*, we will make ſome little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waſte, and conſume, is a Common *Experiment*: And I doe apprehend it the rather, becauſe of mine owne *Experience*. I had, from my *Childhood*, a *Wart* upon one of my *Fingers*: Afterwards when I was about Sixteene Yeares old, being then at *Paris*, there grew upon both my *Hands* a Number of *Warts*, (at the leaſt an hundred,) in a Moneths ſpace. The *Engliſh Embaſſadours Lady*, who was a *Woman* farre from *Superſtition*, told me, one day; Shee would helpe me away with my *Warts*: Whereupon ſhee got a *Peece* of *Lard*, with the *Skin* on, and rubbed the *Warts* all over, with the *Fat Side*; And amongſt the reſt that *Wart*, which I had had from my *Childhood*; Then ſhe nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, upon a *Poaſt* of her *Chamber Window*, which was to the *South*. The Succeſſe was, that within five weekes ſpace, all the *Warts* went quite away: And that *Wart*, which I had ſo long endured, for Company. But at the reſt I did little marvell, becauſe they came in a Short time, and might goe away in a Short Time againe. But the Going away of that, which had ſtaid ſo long, doth yet ſticke with mee. They ſay the like is done, by the *Rubbing* of *Warts* with a Greene *Elder Sticke*, and then *Burying* the *Sticke* to *Rot* in *Dunge*. It would be tried, with *Cornes*, and *Wenns*, and ſuch other *Excreſcences*. I would have it alſo tried, with ſome *Parts* of *Living Creatures*, that are neareſt the *Nature* of *Excreſcences*; As the *Combes* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beaſts*, &c. And I would have it tried both wayes; Both by *Rubbing* thoſe *Parts* with *Lard*, or *Elder*, as before; And by *Cutting off* ſome *Peece* of thoſe *Parts*, and laying it to *Conſume*; To ſee whether it will Worke any Effect, towards the *Conſumption* of that *Part*, which was once *Joyned* with it.

998 It is conſtantly Received, and Avouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it ſelfe. In this *Experiment*, upon the Relation of *Men* of *Credit*, (though my ſelfe, as yet, am not fully inclined to beleeve it,) you ſhall note the *Points* following. Firſt, the *Ointment*, wherewith this is done, is made of Divers *Ingredients*; whereof the Strangeſt and Hardeſt to come by, are the *Moſſe* upon the *Skull* of a *dead Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. Theſe two laſt I could eaſily ſuſpect to be preſcribed as a Starting Hole; That if the *Experiment* proved not, it mought be pretended, that the *Beaſts* were not killed in the due Time;

For

For as for the *Moſſe*, it is certaine, there is great Quantitie of it in *Ireland*, upon *Slaine Bodies*, laid on *Heaps*, *Vnburied*. The other *Ingredients* are, the *Bloud-Stone* in *Powder*, and ſome other *Things*, which ſeeme to have a *Vertue* to *Stanch Bloud*; As alſo the *Moſſe* hath. And the *Deſcription* of the *whole Ointment* is to be found in the *Chymicall Diſpenſatorie* of *Crollius*. Secondly, the ſame *Kinde* of *Ointment*, applied to the *Hurt* it ſelfe, worketh not the *Effect*; but onely applied to the *Weapon*. Thirdly, (which I like well) they doe not obſerve the *Confecting* of the *Ointment*, under any certaine *Conſtellation*; which commonly is the Excuſe of *Magicall Medicines*, when they faile, that they were not made under a fit *Figure* of *Heaven*. Fourthly, it may be applied to the *Weapon*, though the *Party Hurt* be at great *Diſtance*. Fiftly, it ſeemeth the *Imagination* of the Partie, to be *Cured*, is not needfull to Concurre; For it may be done, without the Knowledge, of the *Partie Wounded*; And thus much hath beene tried, that the *Ointment* (for *Experiments* ſake,) hath beene wiped off the *Weapon*, without the Knowledge of the *Partie Hurt*, and preſently the *Partie Hurt*, hath beene in great *Rage* of *Paine*, till the *Weapon* was *Reannointed*. Sixtly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Inſtrument* of *Iron*, or *Wood*, reſembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Annointing* of that *Inſtrument* will ſerve, and worke the *Effect*. This I doubt ſhould be a Device, to keepe this ſtrange *Forme* of *Cure*, in Requeſt, and Uſe; Becauſe many times you cannot come by the *Weapon* it ſelfe. Seventhly, the *Wound* muſt be at firſt *Waſhed cleane*, with *White Wine*, or the *Parties* owne *Water*; And then bound up cloſe in *Fine Linnen*, and no more *Dreſſing* renewed, till it be *whole*. Eighthly, the *Sword* it ſelfe muſt be *Wrapped* up *Cloſe*, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you *wipe* it off from the *Sword*, and keepe it, will *Serve againe*; and rather *Increaſe* in *Vertue*, than *Diminiſh*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointments* of *Wounds* commonly doe. Laſtly, it will *Cure* a *Beaſt*, as well as a *Man*; which I like beſt of all the reſt, becauſe it ſubjecteth the *Matter*, to an *Eaſie Triall*.

Experiment Solitary touching *Secret Proprieties*.

999 I Would have *Men* know, that though I reprehend, the *Eaſie Paſſing over*, of the *Cauſes* of *Things*, by Aſcribing them to *Secret* and *Hidden Vertues*, and *Proprieties*; (For this hath arreſted, and laid aſleepe, all true *Enquiry*, and *Indications*;) yet I doe not underſtand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot ſo fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Phyſicke*, if you will cure the *Iaundies*, it is not enough to ſay, that the *Medicine* muſt not be Cooling; For that will hinder the *Opening* which the *Diſeaſe* requireth: That it muſt not be *Hot*; For that will exaſperate *Choler*: That it muſt goe to the *Gall*; For there is the *Obſtruction* which cauſeth the *Diſeaſe*, &c. But you muſt receive from *Experience*, that *Powder* of *Chamæpytis*, or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wiſe *Phyſitian* doth not continue

still the same *Medicine* to a *Patient*: But he will vary, if the first *Medicine* doth not apparently succeed: For of those *Remedies*, that are good for the *Jaundies*, *Stone*, *Agues*, &c. that will doe good in one *Body*, which will not doe good in another; According to the Correspondence the *Medicine* hath to the *Individuall Body*.

Experiment Solitary, touching the Generall Sympathy of Mens Spirits.

1000 THe *Delight* which *Men* have in *Popularitie*, *Fame*, *Honour*, *Submission*, and *Subjection* of other *Mens Mindes*, *wills*, or *Affections*, (although these *Things* may be desired for other *Ends*,) seemeth to be a *Thing*, in it selfe, without Contemplation of Consequence, Gratefull and agreeable to the *Nature* of *Man*. This Thing (surely) is not without some Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Divine Limbus*; Else why should *Men* be so much affected with that, which others thinke, or say? The Best Temper of *Mindes* desireth *Good Name*, and *True Honour*: The Lighter, *Popularitie*, and *Applause*; The more depraved, *Subjection*, and *Tyranny*; As is seene in great *Conquerours*, and *Troublers* of the *World*: And yet more in *Arch-Heretickes*; for the introducing of new *Doctrines*, is likewise an *Affectation* of *Tyrannie*, over the *Understandings*, and *Beliefes* of *Men*.

A TABLE OF THE Chiefe Matters contained in these Centuries.

A.

Alchymists,

B.

C.

D

G

H

Horses

I

N

O

P

Q

R

S

Nullitie

T

V

W

Y

Z

FINIS.

His Lo^ps. Uſuall Receipt for the Gout, to which the Sixtieth Experiment hath reference, was this.

To be taken in this Order.

1. The Pultaſſe.

℞ *Of Manchett, about 3. Ounces, the Crumme onely, thin cut; Let it be boyled in Milk, till it grow to a Pulp. Adde, in the end, a Dramme, and an halfe, of the powder of Red Roſes.*
Of Saffron 10. Graines.
Of Oyle of Roſes an Ounce.
Let it be ſpred upon a Linnen Cloth, and applyed luke-warme; And continued for three Houres ſpace.

2. The Bath, or Fomentation.

℞ *Of Sage-Leaves, half an handfull.*
Of the Root of Hemlock, Sliced, 6. Dramms.
Of Briony Roots, half an Ounce.
Of the Leaves of Red Roſes, 2. Pugills.
Let them be boyled, in a pottle of Water, wherein Steele hath been quenched, till the Liquour come to a Quart. After the Straining, put in halfe an handfull of Bay-Salt.
Let it be uſed, with Scarlet Cloth or Scarlet Wooll, dipped in the Liquour. hot, and ſo renewed ſeven times; All in the ſpace of a Quarter of an Houre, or little more.

3. The Plaſter.

℞ Emplaſtrum Diacalciteos, *as much as is ſufficient, for the part, you meane to cover. Let it be diſſolved with Oyle of Roſes, in ſuch a Conſiſtence, as will ſtick; And ſpred upon a peece of Holland, and applyed.*